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KOFORD, CARL
FEBRUARY 1951-NOVEMBER 1952

PANAMA-PERU-CHILE

FEBRUARY 1951-NOVEMBER 1952

* CATALOGUE NOS. 909-1700

* JOURNAL

SPECIES ACCOUNT

Vicugna [PART 1]

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SPECIES ACCOUNT
Vicugna [PART 1]
pages 1-252

C. Koford
1951

Vicuña

Vicuña vicuña

March 24, 1951

Arequipa, Perú.

Talked with Mr. & Mrs. Arthur H. Williams. They formerly owned, & lived at, the Esquilache mine near Puno. Mrs. W. had a large quilt made of fur from the lower legs of vicuñas (patitos). Each piece perhaps 3" x 6" and all sewn together. Made & stamped in Bolivia. Traffic in vicuña articles prohibited in Perú. The Williams' said there were hundreds of vicuñas near road to Puno near the highest part. There was always a "scout" out. Females in bands of 8 or 9 & males in bands 100 or more. Dashed how they knew the sexes. They said by the size of the bands & because of young with females. Mrs. W. said many vicuña articles made in La Paz area.

March 26, 1951 Talked with Wm. H. O'Brien, of Draper & Co. (wool outfit) of Boston (540 Atlantic Ave.), about vicuña wool. He said he would like to buy some but would accept it only on board ship as it was hard to get out of the country. It sold for about 7(?) sales a pound in the high country and for 50 in the U.S. Even if legally exported the Peruvian govt got half the profit. The govt farm at Chuquibambilla had vicuña wool raised there but wanted very high price for it. The only person now able to export this wool was Sr. Paredes Pérez of Hacienda Cala Cala, near Puno & Juliaca. Paredes had domestic vicuña ranch and would probably be glad to have company. Crosses of vicuñas with alpacas produced good wool but hairs were not of uniform size. Vicuña wool was

JournalVicuña

March 26, 1951.

Arequipa, Peru

finest in the world - hairs very fine. Mrs. W. had told me that leather not strong + stitches easily pulled out.

April 8, 1951

Nri. Huaylarco, N. Moquegua, Peru.

On road from Arequipa to Puno at about 15000 ft. elevation, at km. 133 mark from Arequipa, saw 6 young and 10 adult vicuñas. The young small + uniform light color. Adults with reddish-brown bodies and light underparts. 6-5 young gambled playfully back and forth across the road. One adult ^(the ♂?) stood 100 yds. from this ¹⁰ and seemed to pay no attention to them. One of bunch gave a set, screech and the bunch, including the separated one (separated?) ran off. At km. 136 saw 7 adults on flat green grassy area. In first bunch, one occasionally panned barren appearing ground and then seemed to sit at the spot. At km. 139, 7 adults (1 separated) on rolling green grassy hills. Another bunch of 3 grazing by road. Then another bunch of 11 adults, another of 5, and a lone one 200 yds. away - no small young in these groups. Two fought, rising up + kicking with forefeet, and ^{one} chasing other (3:20 p.m.). Many thought some or most of these were subadults. ^(prob. young or ♂) At km. 140, groups of 8, 2, and 1 adults. At km. 141, group of 7, & 1 (adults). Then 10 adults with 3 young. Then 6 adults with 1 young. Km. 143, 5 adults. Then 10 adults + 1 young. Then, at about continental divide, counted herd of 57⁺, no babies, on green slope near crest; this at 3:45 p.m. Km. 144, 5 adults, 4 adults, 2 adults. ¹⁴⁵ K 146⁺, on Puno side divide, 13 adults. Km. 146 (142 Puno), 4 adults and 2 adults. Saw no sheep, llamas, or alpacas in vicuña area but last group seen within 1/2 mile of 200[±] alpacas. Vicuñas apparently only at highest altitudes.

Vicuñas

April 8, 1951

50 miles W. Puno, Dpto. Puno, Perú.

udes here - over 4500 meters or 15000 ft., perhaps.

April 9, 1951 at km. 110 from Puno (Arequipa road) saw 5 adults and 2 young in one bunch and 3 adults in another. Green rolling hills. Alpacas within 1/4 mile of the vicuñas.

April 12, 1951

Heda. Pairumani, Nr. Ilave, Dpto. Puno, ^{Perú}

About 11:30 a.m. saw 4 adults at foot of hillside near road 1/2 mile toward Mazocruz from turnoff to Heda. Pairumani. ~~Low~~ Lowest yet seen (13000').

April 27, 1951

W. Dpto. Puno & E. Dpto. Tacna, Perú.

Drove from Mazocruz to near Livine on road to Tarata. Saw 2 vicuñas 34 miles from Mazocruz on flat area with short tala (13700'). 9 miles further on saw 5, again in short tala (nr. km. 180 to Tacna). Then 45 miles from Mazocruz saw groups of 4, 3, then 24, on a large flat short grassy area where hundreds of alpacas & llamas grazed. Vicuñas in groups separate from domestic animals but some groups within 50 yds. ^{a mile further on,} alpacas. Then, saw group of 6 adults with one light cream-colored young (no young seen earlier). The flat ended about km. 175 to Tacna. Ascending from Chapallaca toward Livine saw group of 4 at about 14,500', about 50 yds. above group of 30± llamas. Moderate slope with pronounced bands of grass, low tala, & yareta.

April 28, 1951. Three miles toward Tacna from Livine encountered 14 near water (small stream). One band of 9 including 2 young, another of 5 including 1 young. They walked slowly away

Vicuña

April 28, 1951 Nr. Tacna - Puno border, Dpto. Tacna, Perú.
 from us, tails down. An hour later returned & found same
 number & grouping at this spot. Saw 2 roll on backs in dust,
 vigorously, at about same spot. About 1 mile before reaching
 Livine saw group 8 adults & 3 young, there in place where about
 5% ground cover, or less, most of ground being rocky or sandy
 & of gentle slope. Calceolaria proteoidea among the brown rocks
 but not in vegetated areas. All young about half grown,
 of uniform pale coffee color (^{dark} cream color).

April 29, 1951 ^{Perú:} Nr. Livine, 21 mi. NE Tarata, Dpto. Tacna,
 about 5 p.m. saw ^{about} 10 at head of canyon in which we
 were camped, at elev. 15500' ±. They took alarm at a
 distance of over 1/2 mile and ran single file, up a
 gentle rocky slope. Much more wary than those we had
 seen near the road.

April 30, 1951 Returning to camp about 9 a.m., heard chi-
 chi-choo-choo, choo sound & saw 9 vicuñas on
 ridge to S. of camp. First two notes squishy & about
 high C above middle C. "Choo" is each descending in
 pitch & ^{much} lower than first 2 notes. Herd was 6 adults
 and 3 young - probably same as seen last evening
 and near stream W. of Livine on April 28. Very
 hard to see these animals against reddish-brown ^{rock} soil.

May 1, 1951. About 9 a.m. heard vicuña noises & saw 8 ± ~~half~~
 halfway up ridge near camp. Some sounds like faint hee-
 law of male. In mid-afternoon saw 7.5 on ramparts of Chelli-
 sulco within a distance of 5 miles. Saw 4 near road about
 4 miles toward Challapalca from Livine. One loose band

Vicugna

May 1, 1951

W. Dpto. Puno, Perú.

of 47 on Chilliculca pampas. One group of 5 chasing one another. When running fast, head held low - shoulder height sharpness of turns in chasing was spectacular. Hundreds llamas & alpacas on the pampas, & many hollotobais; consequently poor for study of undisturbed animals & ground.

May 2, 1951. ~~Q~~

Lluta, W. Dpto. Puno, Perú.

On Lluta pampas saw 10 adults + 1 young in a band. Many llamas & alpacas here ~~too~~ in this wet meadow. All young seen have been half grown & of uniform dark cream color.

May 3, 1951.

Pasto Grande, Dpto. Puno, Perú.

Drove from Paucamani to Santa Rosa & Pasto Grande. Saw first vicuñas (2) ^{P.C.} on plain (15000') just after reaching it.

Drove toward Tutupaca. 3 miles along plain saw 6 vicuñas with 1 young. 2 miles further saw 16 on a hill of sand, no vegetation visible at a distance. They had heads down as if feeding & 2 were lying down. Saw 4 near shore of lake. Then 8 5 miles beyond lake & 9 two miles further on, still on the plain. Then 4 on gentle sand hill a mile further on, 4 on flat .8 miles on, and 10 including 2 young a mile further. .8 miles on, 8, 4, .5 miles on, 6. Then ~~6~~ groups 2 & 4 in next mile. Sheep, alpacas, & llamas on same plain, & occasional ^{sheep} ~~sheep~~ dogs.

May 4, 1951.

Nr. Pasto Grande, Dpto. Puno, Perú.

Camped 5 miles from Tutupaca road on Cacachara road at 15300'. Heard straggly cries from high on a ^{steep} slope near camp & saw 2 vicuñas. They ran along side of hill & over tops. About 3 miles toward Caca-

Vicuña

May 4, 1951

W. Dpto. Puno, Perú

chara saw band 7 including 1 young. ascending slope beyond
Cacachera river saw 13 plus 3 young at about 15500', & at
road summit, 15700', saw 43 in one group in rocky area
where water & some vegetation. They allowed car to approach
to about 100 yards. No young apparent - all ♂♂? The
Pasto Grande plain seems ideal for vicuña study. Plenty of
animals. Good road & often good cross country jeep sur-
face. Variety of habitats & slopes - including sand. Many
bands, well separated, available. Sheep, llamas, & alpacas
present - as everywhere, including Cacachera - but not
excessive & few people & fewer cars. Main disadvantage is
bad road down to Mayocruz, perhaps impossible in wet
season. At Mayocruz 2 control guards wanted to buy
my escapeta. One took me aside & offered me a vicuña
hide (cuero). He said he had friends in Lima who could
easily fix it so I could take ^{hide} it out of Perú.

May 9 - 15, 1951. Stayed Hacienda Cabcocha, 7 mi. SW Puno, Dpto. Puno.

Made ourselves apparently welcome guests at this large and
old hacienda where Francisco Paredes Pérez raises vic-
uñas & has crossed them with llamas & alpacas.
Paredes had pamphlet "Vicuña, the world's finest fabric," by
Sylvan J. Stroock, S. Stroock & Co., Inc., New York,
404 Fifth Av., in English. Paredes had been an aficionado
of raising vicuñas since 1919. His grandparents had owned
this hacienda. He first ^{crossed} ~~crossed~~ vicuñas in 1931. He started
his herd by catching young vicuñas with dogs & rais-
ing them - 30 or 40 caught in all, he said. Now his

Vicuña

May 9-15, 1951

Hacienda Calacala, nr. Pitina, Depto. Puno

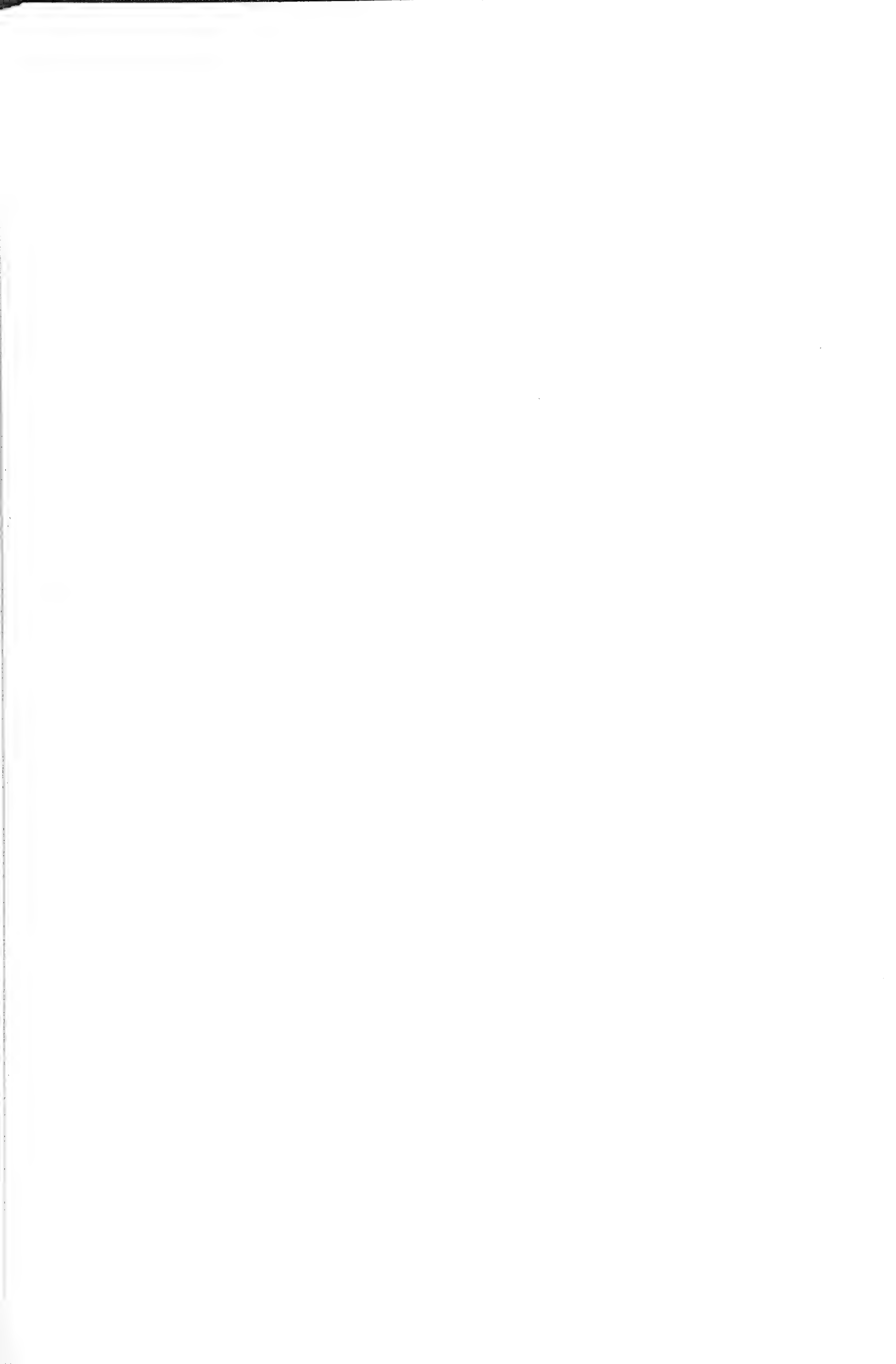
herd numbers about 400. He doesn't know exactly as Indians kill some, some jump the wall & leave, others return. I saw adult & young jump $4\frac{1}{2}$ ft. stone wall, first jumping to top, then down on other side. Paredes says a fence of wire mesh 1 m. 80 cm. high will hold vicuñas. The young are mostly born in March. Shearing (desguile) also in March, & the season of ^{"cele"} ~~"gelo"~~ is in March & April. The ♂♂ bother ♀♀ much in this season (bite off hair & carry it in mouth, & chase ♀♀) so ♀♀ with young kept in separate pasture from ♂♂. Vicuñas live about 20 years, have ^[11] 9 months gestation, produce wool of good quality about 8 years at rate of $\frac{1}{4}$ lb. per year (quality not lost until old). Crosses with alpacas (feeding with cow's milk) achieved by raising young ♂ vic. with young ♀ alpacas, then they will interbreed. Paredes has not ^{bred} ~~crossed~~ these paco-vicuñas together but believes it easily done, but he has crossed vicuña ♂ with paco-vic. ♀ and produced $\frac{3}{4}$ vicuña paco vicuñas with long & fine hair. In 1944 when Strach was offering \$5/lb. for vicuña wool it offered \$4 for the $\frac{3}{4}$ vicuña, but no sale was made as Paredes had little wool to sell. P. thinks vicuñas not lower in altitude because shot. He thinks vicuña wool as good here as higher up but that alpaca wool usually is not (not positive on this point). Crosses with alpacas are always more or less vicuña color (dominant) but crosses with white alpacas not made (some alpacas are vicuña

Vicuña

May 9-15, 1951.

Hacienda Calacala, Dpto. Puno, Peru

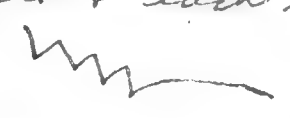
color). His last sale, to Stokes & Co., was 4 "fardos" or 645 lbs. wool for base price of \$10^{U.S.} per lb. At completion of deal the govt took half the profit (difference split by Stokes & Paredes). Of the herd about 100 are castrated or ♂ (larger, more wool, more docile), 20 ♂♂, 200 ♀♀. 60 or 70 young per year, in March, April, May. First bred at 2 years of age. In walled pasture (perhaps 1 square mile, irregular & hilly), saw many of the crosses. As all mixed there must sometimes be doubts about parentage of young (crias). Perhaps 50 crosses in all, mostly llama vicuñas. These appear like long eared vicuñas of dark color - long chest hair notably dark rather than near white as in vicuñas. Main advantage of wool is that it is 3 or 4 times longer than vicuña & animal is larger. The long chest hair & brown color in all crosses. Paredes says he needs fences for experimentation & more exact knowledge of parentage. He tried white llama once without success. Some of crosses with llama have white faces. Paredes says the vicuñas eat same forage as the other animals - principally Corriedale sheep. Several grasses available in pasture. Vicuñas in the pasture generally rather wild. Only one allowed petting. None spit when approached but rather kicked outward and backward with a hind foot. Tail normally carried down flat on rounded rumps in alpaca fashion. Ears expressive and usually laid back horizontally when man near (this precedes spitting by llama). On one occasion saw two standing facing in opposite directions, backs of heads ^(occiputs).



Vicuña

May 9-15, 1951

Hcda. Calacala, Dpto. Puno, Perú.

close together, one spitting audibly into air at intervals. The commonest sound seems to be a warning, a whistling squeak like a wet cork being rubbed back & forth on glass, the back & forth sound repeated about 5 times with higher & lower sound about 2 notes apart & each repetition about $1\frac{1}{2}$ notes lower than previous . Sometimes more squeaky & others more pure whistle. Mouth closed while sounds given. Vicuñas respond to this sound, ^{or imitations of it.} by raising heads from foraging. They can run very fast & turn rapidly. Head low & neck horizontal in fastest running. Head very steady in running though body moves much. Paredes says he can distinguish between ♂ & ♀ by size, ♂ being larger (but most ♂ castrados). Ears of most cropped or notched as if with marking system. In shearing (march) they are lassoed individually. Only brown wool is cut. P. showed us 2 $\frac{3}{4}$ vic. ~~+~~ - $\frac{1}{4}$ alpaca crosses & gave me hair samples; hair much longer than vicuña but appeared coarser to naked eye. No wild vicuñas in this area. Young a year old are distinguishably smaller than adults. Photographed llama & alpaca crosses in corral. About 15 Indians walked in open line through vicuña pasture to ~~catch~~ drive them into corral (to show us) but only about $\frac{1}{4}$ were captured.

May 16, 1951

La Raya, 14100' Dpto. Puno, Perú.

At the Granja Modelo at Chuquibambilla (betw. Ayacucho Sta. Rosa) talked with the director. He said the alpacas & vicuñas were at La Raya & that they had only had the vicuñas for one year and alpacas for 3 years. He said



Vicuña

May 16, 1951

La Raya, 14100 ft., Dpto. Puno, Peru.

they had never made any crosses. The vicuñas were purchased & some were ~~crosses~~ ^{crosses} of unknown parentage. Present plan was to breed them to white alpacas, breed the paca vicuñas together to get segregation, then select to fix desirable characteristics. A veterinarian at Chuguil. was interested in this & in artificial insemination but time, money, equipment, & study were needed. Director offered me all facilities of Chuguil. & La Raya if I wished to study *Lagomys* there. Artificial insemination difficult because reproductive cycle unknown & copulation lasted an hour or more. We drove on to La Raya, about 2 hrs. for 35± miles because of poor road. There talked to the resident ingeniero. There were good mesh wire fences with steel posts, fence topped with a strand barbed wire. Fence on 3 sides of about 1 square mile pasture, & open side against steep slopes & mountains (rocky & snow capped). We were allowed to walk around among the animals. About 40 vicuñas & 100 white alpacas intermingled in pasture & appearing quite friendly. Some vicuñas young & some appeared to be crosses. Some with metal tags in ears. Three, one at a time, came toward us when we approached & could nearly be petted. Two Indian girls watching the alpacas. Some young alpacas with the adults. all alpacas said to be ♀♀. The resident seemed to know little about what was going on; mainly a caretaker. He said several vicuñas had been lost to pumas. There was only one corral, no provision for segregating breeding animals. Wild vicuñas said to be seen occasionally & to be common in the heights over nearest ridges.



Vicuña

May 17, 1951

Nr. Crucero, Dpto. Puno, Per. U.

Ascending from Areillo to Crucero by road, saw first at 13300 feet about 3.8 miles before Rosario at foot of grassy hills, 11 adults + 3 young (unicalad). Saw none along plain near Crucero until 9.4 miles beyond toward Limbani, then saw 8. 3.1 miles on at 14100' saw 6. 1.1 miles on saw groups of 6 $\frac{9}{2}$ 3 $\frac{4}{2}$ ~~15~~. Another 1.3 miles on. These all in short grass rolling hills of brown color (drier than Calacala?). Late in day, about sunset, saw groups of 2 + 6 (incl. 1 young), and again 6, in lower 2 miles of Lake Areuma on slope near shore. All these seen with naked eye from road. Too late in day for good observation near Areuma.

May 18, 1951

• Nr. Poto, Dpto. Puno, Per. U.

Drove along road from Limbani - Pato fork (near Crucero) to Pato, mostly along flattish upper Carabaya river. 6 miles from fork saw 2 (13800'). At 1400', 4.5 miles on, saw 1, + one (bank river). 6 miles on. Two with 1 young 4.1 miles further. Then 5, 1.5 miles on, + 21 total a few hundred yards on (large rock outcroppings near river; band of 7 including 1 young included in total, ~~other groups smaller~~). Then 4.8 miles on saw 6 (1 young). One on river bank 3.2 miles on (.3 miles short of turnoff to Sandia). 6 miles beyond Sandia road saw majada of 5, + groups of 7 + 6 (1 young) 1.1 miles further on. Then 5 + 2. 2.7 miles beyond Sandia road saw 4, + 3.2 miles from junction saw 17 (on flat near river, 8 largest band. Within $\frac{1}{10}$ mile saw other groups - 3 + 5 + 3. Then ~~2~~ ⁴⁰ 3 up a broad side canyon to NE of road (short grass, heads blown, stone

Vicuña

May 18, 1951

Nr. Poto, Dpto. Puno, Peru.

houses). 1. 4 miles on saw 3, + 5 more 3.4 miles ^{on} (flat plain near 50 geese). 2. 7 miles on saw 6 + 2.5 miles on another 6 (1.9 mi. before Poto turnoff). Drove to Poto + about 3 miles uphill beyond to 1/2 mile down. Lake on flattish large plain. There saw 3 vicuñas in side canyon, 20 on lake shore near hills, + 15 more on plain near lake (15500 ft.). About 4 p.m. left Poto-Cruces-Putina fork + drove toward Putina. 3. 2 miles from fork, on broad dry gentle grassy slopes, saw 5 in groups (15100'), + 3 more 1.5 miles on at summit of road (15100'). Late then + saw no more on way down to Putina.

May 19-20, 1951

Heda. Calacala, Dpto. Puno, Peru.

More talk with Paredes revealed that he knew nothing of genetics + thought his 3/4 vicuña paco-vicuña the end product. We tried to explain about segregation + possibilities for selection in the F2 generation. We suggested raising 10 or so young good alpacas with one or two young ♂ vicuñas which would then breed with the alpacas + provide paco-vicuñas for interbreeding to get segregation of characters. Paredes said the story about killing baby alpaca + putting its skin on baby vicuña to get alpaca to adopt same is false. He takes the two young (alp. + vic.) + raises them on milk together; then breeding is sure. So far he has only used ^{vicuña} alpaca colored ^{alpacas} vicuñas. Segregation of ♂♂ + ♀♀ in separate bands is also false, he said. Mauro Valasquez told me a band ♀♀ ruled by a ♂ who stood apart + warned them when danger approached. Today Mary had tame vicuña spit at her twice when she scratched its neck. Bits of shaved



Vicuña

1951.
May 19-20, 1950

Heda. Calacota, Dpto. Puno, Peru.

grass but little saliva discharged. Vicuña did not seem to be mad, however. In corral saw one vicuña which appeared to be pregnant. ~~Some~~ Many adults with young were in one corral in evening. The single young of several sat on ground alongside their ^{respective} mothers, facing same direction. Some ♂♂ in with them pursued ♀♀ and hit them on the back. The ~~llama~~ alpaca crosses had thick necks compared to the vicuñas. Paredes said that during one storm 20 vicuñas in corral killed themselves. The ♂ vicuña he used for breeding died. It formerly bred with alpacas of same "trope" & would fight wild vicuñas.

May 21, 1951 Paredes showed us 5 paco-vicuñas in corral. They struggled strongly when lassoed. Necks & legs thick & animals weighed $1\frac{1}{2}$ or 2 x as much as vicuñas. One had white face. Parentage not exactly known so ^{parent} ♀ could have been huarizo (llama-alpaca hybrid). Wool long & finer than than alpaca. Color darker than vicuña. All had the coarse lighter hair on chest. Got wool samples of 3. Paredes is going to put 4 good young alpacas with young vicuñas for familiarization.

May 21, 1951. Received more of Paredes crosses & obtained wool samples. Of especial interest was a paco-vicuña with its last year's ^(a 3/4 vicuña) young, the young one remaining constantly close to or alongside mother & both having white faces of similar pattern, ^{light} a blue crescent in lower iris, & similarly colored fur. All crosses had long fur hair & finer than alpaca or llama parent. The 3/4 vicuñas somewhat varied in size & conformation. All crosses recognizable by necks & legs being

Vicuña

May 21, 1951

Hoda. Calacola, Dpto. Puno, Peru.

thicker than those of vicuñas. In corral with alpacas, two ^{blacks} were in copulation. ♀ sat on ground in prone position as in resting & ♂ was astride, one forefoot on each side of ♀, & both grunting continually. At our suggestion Parales is putting some (1 each of?) poco-vicuñas together for breeding & is putting 4 young alpacas with mothers with young vicuñas & mothers; he thinks the young ^{may} ~~will~~ breed if raised in this way rather than on saws milk from earliest age.

May 23, 1951.

Rosario, nr. Crucero, Dpto. Puno, Peru.

Saw young one, without rope, behind buildings of this small pueblo, apparently a pet. Driving from near Asillo to Lake Aricoma, saw no wild vicuñas until about 3 miles beyond Crucero - then a group of 3. Between fork to Limbani & the lake saw groups of 6, 6 & 8. Near foot lake saw 2 on so slopes of east side and 1 near camp.

Lake Aricoma, Dpto. Puno, Peru

May 24, 1951. Shortly after 6 a.m. saw 2 in sunshine on ridge above camp. I took walk up road & 1/2 mile from camp saw 6 about 100 yds. above road. One gave grating cry. All ran up slope, the crying one last. Occasionally groups stopped, looked back, & continued on. They stopped about 1/4 mile up slope (still there 1/2 hr. later). At 7:45 a.m. saw group of 4 & 1 across the lake on grassy-rocky slope. Pasture short & apparently heavily used by stock here. Drove over summit toward Limbani. About 1/4 mile past crest saw group of 10 including 2 large young and one adult standing 100+ ft. from group. A mile down the road in another small green canyon saw 6 adults with one young. Near

Vicuña

May 24, 1951

Aricoma, 15000 ft., Depto. Puno, Peru

this site saw a young red fox. $\frac{1}{2}$ mile further down road saw 2 adults with one young. One adult gave squeaking cry. About 10 minutes later one adult + young were lying down + other adult stood 50' away. Returned uphill + saw other groups again, ^{both} the groups ~~of 7 + 10~~ grazing. ~~Shot~~ The largest group had "sentinel?" standing 50 yds. away. I shot a viscacha with shotgun about $\frac{1}{4}$ mile from groups. They slowly started up a hill + within 3 minutes had disappeared over a ridge. At about 3 p.m. traveled same road + saw the groups of 10 and 6 within 100 yds. of former sites. Saw + at site of groups of 3 at dusk, one squeaking (like noise made by air let out of toy ball on thru stretched opening, descending sound). Probably more than these 20 vicuñas in the gran lake-dotted head of canyon leading to Lumbani.

May 25, 1951. Saw 3 about $\frac{1}{4}$ mile SW of the sketched store hut about 6:30 a.m. 7:55 a.m., + above the road to west of camp, one lying down. Another $\frac{1}{2}$ mile further west atop a high knoll. At 9 a.m. I was at site where 5 + 1 young seen yesterday; same number seen above upper road of switchback crossing barren ridge going SW. I about $\frac{3}{8}$ mile from them. Near site where seen yesterday, found lower leg of a young vicuña; carcass feeding on it. ~~at~~ Mary looked for vicuñas in morning + saw at least 10 but no young. about 3 p.m. drove up the road + saw the 6 (1 young) in canyon below switchback where seen yesterday, 11 (2 young) where 10 seen yesterday, 5 in group near road $\frac{1}{2}$ mile from summit, 5 in same basin but a mile to south (Mary saw there apparent same last 2 groups this morning. Apparently groups fairly constant in composition + location. "Young" here = juveniles, born '51.

Vicugna

May 26, 1951 15000'
 8 mi. SSW Limbani, Dpto. Puno, Peru
 At 6:20 a.m. saw 3 on ridge about $\frac{1}{4}$ mile SW of the stone hut.
 About 8 a.m. saw bunches of 5 (S. side), 5, 3, 6 (1 young,
 above upper road $\frac{1}{4}$ mile from top), & 11 (2 young, head canyon),
 all in the basin to east of pass. Many wrote notes on some
 of these. None in northern canyon at 8 or 9 a.m. Apparently
 groups constant in composition except for occasional strays.
 About 10 a.m. Many saw about 16 vicuñas in area to south
 of stone hut; probably these in addition to others seen this
 morning so about 50 in all in upper mile of the broad
 canyon.

May 27, 1951. At 7 a.m. saw & walking across slope $\frac{1}{4}$ mile W. of
 Hut. None seen in North Canyon at 8 a.m. At ^{9:15 a.m.} 9 a.m. saw 5 A1Y (5 adults
 and ^(= juv.) $\frac{1}{2}$ young), below the bend of upper road. They ran, walked & ran up-
 hill parallel to road, the young 3rd. in order. Leader only seemed to
 give cries. 9:20, 5A $\frac{1}{2}$ way to stream from bend of upper road.
 9:35, 3 by stream in lower Basin. 10:20, ^{7A2Y} saw 9 at head of Basin
 about 30' below foot of rock slide. Young lying down. I walked
 down canyon below them & one adult, about 300 yds. below the
 group, ran uphill to group, occasionally stopping & looking toward
 me. At 10:30, the 3+5 seen at 9:20 + 9:35 were at about same
 place. I walked to SE across Basin. The 3 ran up the Basin
 ahead of me, always over $\frac{1}{4}$ mile away. Occasionally they stopped
 & one gave whistling cry ^{like}. At ^{one} point only head & neck of one
 of group was visible, this looking over rock ridge at me. This
 group continued on about $\frac{3}{4}$ mile to W. of first site. The 5, $\frac{1}{2}$ mile
 away, all stood facing me; they soon returned to graze, how-
 ever. 10:45, 4 on stream about 200 yds. above road. Although

Vicuña

May 27, 1951

Dpto. Puno, Perú
8 mi. SSW Limbani, 15000'

I was $\frac{1}{2}$ mile away, they walked rapidly away up a slope. Then saw 3 grazing on north side of ridge $\frac{1}{2}$ mile ^{SW} of camp; at $\frac{1}{4}$ mile, one gave warning cry ^u. 10:50, 4 on wet green slope at SW corner of Basin. 11:05, one on ridge about $\frac{1}{4}$ mile SW camp. This made total of 37 seen in Basin this morning. One day Mary counted 46 including 8 in canyon running SW from camp (not in Basin). This latter canyon contains small lakes, stone hame without roof \cap , & geese. See Journal for place names.


May 28, 1951. Wind down canyon last night. at 6 a.m.

5 on ridge 200 yds. SW camp. At 8 a.m. saw 14 in one ^{group} ~~group~~ above Lower Road near Trail - suppose this was an agglomeration of small groups. Saw 5 in a green draw next west of stream above Lower Road. At 8:45 a.m., saw the groups of 8 & 24 at summit, on flat just N. of road near water. One on S. side road 50 yds. from group. The disturbed group moved away from car (to W.) and crossed road & were joined by the "scattered." all about 100 yds. S. road at 50' higher level at 9 a.m. when we left. 2.1 miles toward Cuicero from summit saw 4 + A + 14 on east side road on small green flat below a cliff. Then .8 miles on saw 5 adults on dry grassy ground 100 yds. from lake Aucima; these ran uphill across road in front of car. Near foot of lake saw 2A on that dry grass flat, & .3 miles on at river outlet of lake saw 28 total, group of 10 + 18. About 6 were in the water (about 1 foot or less deep & running well). at least 3 seen to bathe, one four times within

Vicugna

May 28, 1951

Nr. Aricoma, Dpto. Puno, Per. J.

about 5 minutes. To bathe, first lowered neck so that ~~the~~ ~~back~~ it touched water , then knelt down on front knees, then lower bent back legs so that lying prone, then lowered neck further so that throat and chin were in water, then rose & shook (whole body, rather stiffly, not loosely & progressively as in dog). We continued on toward Sandia. Does dry wind induce aggregation of small groups & seeking of water? The disturbed 20 broke up into $5 \pm$ groups, with some chasing between individuals, as we proceeded on. 5.4 miles from foot lake saw 4 AY near almost dry rocky river bed (uncolor young), + 3 AY .1 mile further on (uncolor young). 6.7 miles from lake outlet saw 7 AY + 5 (all A?) on dry grass gentle open slopes. Drove from Cuzco toward Sandia. 16 miles out saw 1 BA on edge of clear river (outlet Lake Aricoma?). 6.9 miles on saw 9 AY, the young apparently nursing standing at right angles to adult (first apparent nursing seen). Then .9 miles on saw 2, $\frac{1}{4}$ mile apart. 1.5 miles before Sandia turnoff saw 5 AY. Saw many llamas & alpacas but no vicuñas in first 7.3 miles of Sandia road. Returning to camp in dark of late evening (about 5:45 p.m.), one vicuña crossed road in headlights near Bord. Confused by spot-light. Finally crossed road uphill to group of 4 or + on slope. Eyeshine red but not very brilliant. No moon. About 11 miles toward Sandia from Cuzco about 4:30 p.m. we saw one group of 6 A 5 Y, the

V. vicuña

Dpto. Puno, Peru.

May 20, 1951 8 mi. SSW Limbani, 15000';
 highest proportion of young yet seen in a band. Storekeeper
 at Cuzco offered to sell me skin of baby vicuña which he
 brought out ~~in~~ ⁱⁿ unbrashed fashion. He said he had a
 friend with ♀ + ♂ of 1950 birth who would sell me for
 20 libras (about \$15).

May 29, 1951. at 9:45 a.m., on way to Summit traps, saw
 the group of 8424 halfway between Bend + Summit on S. side
 of road, one lying down + others grazing. Same at 10:45, within
 100' of spot. Immatures grazed in manner of adults though
 of cream-in-coffee color. One adult chewed 5 times in
 3 sec. another 7x in 4 sec. One drank from tony (1 ft.
 diam.) pool in grassward. One kept mouth in water
 10 sec., raised head, water dripping from mouth, then
 drank 12 sec. Cars of grazers vertical or slightly for-
 ward. None of 10 stood apart as sentinels. ~~Peep~~ Nibble
 at short greenery 5 to 30 sec., then head up 5 ± sec. to
 look about, then down again. Young less watchful -
 one with head to ground 2+ minutes, seldom over 15 sec.
 one spot before take steps. Nibble 5 ± times rapidly,
 then head gives slight toss + nibbling continues. One
^{young} scratched head with hind legs 5 ± sec., then shook head
 side to side 3 ± times, then raised right flank + left hind
 heel, then scratched nose only with left hind legs, then
 reached nose to anal region + lost balance. One lay
 prone facing downhill; first down on forelegs,
 then hind parts down, then forelegs further down +
 hind further down so lay prone on belly. Tails

Vicugna

May 20, 1951 Recd.
 8 mi. SSW Limbani, Doto Ping
 down along curve body as grazed (one showing another
 yesterday at ft. Lake Arcana held tail slightly above
 horizontal). By 11:10, 2 lying 6' apart facing down slope
 while others grazed diligently I blew game call; the
 sitters rose, others stopped grazing, & all gathered in a
 group, one at edge ridge 20±' from rest (male?).
 They ran 100' half downhill. Within 2 minutes two grazed
 briefly again. Then one gave warning cry ^{uu}. all
 walked up canyon, $\frac{1}{2}$ sec. per step. I then saw a
^{groups}
~~graze~~ of llamas & Indians approaching $\frac{1}{4}$ mile down the
 canyon. I departed down road. It seemed that leader of
 group gave the cry & that the possible ♂ who stood apart
 was last in line. Saw no others in Basin.

June 2, 1951. About 2:30 p.m. saw 3 on S. side of
 S. Ridge, group of 3 and another of 4 to S. of House.
 June 3, 1951. Inspecting traps 6:45 to 7:45 a.m. At
 6:45 saw 2 ♂♂ in string out group about $\frac{1}{4}$ mile
 ESE of House as if coming up out of draw to SE of
 H.S. Ponds. Some chasing. Group spread 200 yds. Among
 rock outcroppings (low) & short brown grass. ⁶7:50 a.m.,
 saw 3 (one a yearling?) on S. side of S. Ridge at
 edge S. Basin, & a lone one 200 yds. further up S. Ridge.
 8:55, noted 16 scattered in flattish grassy area
 $\frac{1}{2}$ mile SSE House, then spread $\frac{1}{4}$ mile & moving
 slowly or lying down. 9:58, one stops state of
 rock outcropping $\frac{1}{4}$ mile WSW of House. Then
 saw 9, $\frac{1}{4}$ mile SE of House, moving eastward in

Vicugna

Peru

June 3, 1951.

8 mi. SSW Limbani, 15000', Dpto. Puno,

single file, slowly. Then at 7:02 saw 3 adults on N. side of S. Ridge (same as 6:50?). 7:10, when at Two Huts, saw groups 4+3, about one group 200 yds. beyond other, closest 200 yds. to WSW. The furthest group started for steeper slope to S. of them, slowly. 7:20, group of 4, one lying down, 1/2 mile W. of Two Huts. 7:30, 5, 2 lying down, just below road at Bend, + 2 others visible below road near summit. Thus, 3+4+4+5+2 visible in Basin. Perhaps the 8+2 are at summit. Cold fair wind down canyon. 7:40, again at edge S. Basin, saw 22 (6 lying down) where the 27 had been, + 16 scattered 1/2 mile S. of House about as earlier. One grazing near House. Censuses:

S. Basin $27+9+16 = 52$ Basin $3+4+4+5+2 = 18$ Total 70, with familiar groups 10+7 not seen.

June ⁵ 4, 1951. Visiting traps 8 to 9 a.m. 8:10, 5, 4 lying down, on nearly flat grassy ground 1/2 mile SSE of House. Another grazing near House, another on S. Ridge near base of rocky hill. 8:20, group of 4 about 200 yds. SW, + 3, 1/4 mile W., of Two Huts. Alarmed at my approach but soon continued to graze. 8:30, I at Two Huts, atop a knoll. Saw 10 near the head of canyon below summit, + 9 below the road near Bend. Of 9, upper + lower lying prone. Then saw 4 about 1/2 mile W. of Two Huts. At 9 a.m., at least 8 about 1/2 mile SSE of House on rocky low knoll, others about as before, + another 1/4 mile west of House. In all, $10+9+3+4+1+1+5+4+8 = 45$ minimum.

Vicugna

June 6, 1951

Dpto. Puno, Peru.
8 mi. SSW Limbani, 15000'

Visited traps at noon. 6 adult vicuñas on S. E. side of Two Huts knoll at 12:05 p.m. at 300 yds. they fled from me giving throaty calls. Possibly same group seen at 12:30 grazing near foot of slope below SW mdr. At 12:30 saw 10 at head canyon near summit, as yesterday, + 8 (or more) below Bend near stream. Another 4, apparently unharmed, grazed 1/4 mile SW of Two Huts, 2 of them lying prone + others grazing. ~~When~~ About 7 a.m. saw + heard 3 on S. side S. Ridge near base of steep rocky hill, + another 1/4 mile NW of South Ponds. Later in day one grazing + later lying prone on east bank of South Ponds; did not rise when jeep drove within 200 yds. - perhaps the one which is often seen near these ponds. at 5:40 p.m., when just able to see, I saw 3 about 1/2 mile SW of House on a 100±' higher level.

June 7, 1951. At about 7 a.m., 3 grazing on SE side of S. Ridge about 1/4 mile N. of House, + one on east side of S. Ponds. at 9 a.m., the 3 were 1/4 mile further to the west on same slope, + one on by ponds was lying prone on hill, facing westward. About 11 a.m., I walked to Two Huts. At 11:30 saw 6 about 1/4 mile SE of House, one atop rocky knoll, crying. Encountered 3 on S. slope of S. Ridge. at 200 yds. they fled with many squeals + calls - sometimes bray-like - a throaty monotone cry repeated about 5 times. They walked slowly away + up ^{ridge} ~~ridge~~. At 11:45 I encountered 4 on W. side of the Two Huts knoll. These moved away + downhill at moderate pace, often traveling singly in file. Saw 11 in canyon near summit.

Vicugna

June 7, 1951

Perito
Aricoma, 15000', Dpto. Puno,

where seen last 2 days; probably same groups (28?). Fair breeze up canyon. 12:00, 5 about $\frac{2}{3}$ way to stream from Bend. These took alarm at 500± yds. & walked along slope up canyon. ~~Saw~~ Occasionally, one gave whistling cry - re, do, ti, la, sol - only ending on la as notes not whole steps. These walked up canyon parallel to me. Then saw 4, 3 lying prone, at S. edge Basin (foot Center Hill). None near Loop or Pond. Approaching S. Pond, 4 ran across 200 yds. in front of me to NE side of ponds & stood scattered & nervous as I passed within 100 yds. At 2:50 p.m. started southward on exploratory trip from House. $\frac{1}{2}$ mile from House, 3:05 p.m., saw groups 6+3 near each other, & 4 about $\frac{1}{4}$ mile SW of these, all on gentle brown short grass slope. at 400 yds. from me, the 6+3 ran up slope in separate bunches; wind from me toward them. 3:10, 5 more about $\frac{3}{8}$ mile S. of House; at 200 yds. I started them from near a clear stream, they giving alarm whistle. The 3 (of 6+3) joined the 4 so 7 in that group. 3:20, I was about 1 mile SSE of House, & I saw 3AIV downwind to east. The young smaller than most here. This is in valley draining from glacis at SE edge of S. Basin (SE Canyon). across this canyon, 100 yds. from stream, saw 3 more grazing on very green ground, & another 4 close to this stream. 3:30, further down SE Canyon on a flat, about 1 mile from me (about $1\frac{1}{2}$ miles E. of House), saw group of 26 (or+) in area 100 yds. across (same as seen nearer house several days ago?). Another 5 seen $\frac{3}{4}$ mile SW of the 6+3+4. On

Vicugna

June 7, 1951

Aricoma, 15000', Dpto. Puno, Peru

way back to ^{House} ~~can~~ via Ice Falls, saw about 25 vicuñas, most of them probably already counted. At any rate, at least 60 seen in S. Basin ~~area~~ (counting SE Canyon). No trend of movement to any particular area for the night is apparent.

June 8, 1951. From 9 a.m. to 1 p.m. I was walking & working with traps between House & SW Pass. Saw some small groups to S. of me. 9:33, a group of 14 about 1/2 mile S. of Ice Falls & 200' above, 4 lying down; grouse 5, 3, & 1 on steep rock & bare dirt slopes, others on brown grass of adjacent draw (border pasture & rocks). At 9:50, from a hill above (to N) of Ice Falls, saw 2 + 14 + 2 + 4 + 6 + 3 in the 120° sector to S between SE & SW of me, all within 1 mile, mostly on gentle rolling NE facing grassy brown slopes. Plenty water in ponds & streams throughout this area. On the steepest shale slides above grassy area there are apparent vicuña trails slanting upward & sometimes switching back; occasional excrement piles along these routes. The highest passes seem to be crossed at times. At 11:10 a.m., when at SW Pass, saw group of 9 on a high meadow 1/2 mile west of the 14, near beginning of rock slides. This group moved slowly, single file, down & across slope. Reproduction very poor among vicuñas because young rarely seen, & in small proportion to adults.

June 9, 1951. at 11:30 a.m. I returned from trap line in light snowstorm & Mary called my attention to 23 vicuñas in band near N. edge of S. Ponds. Some grazing, ^{or} lying prone. I saw

Vicuona

June 9, 1951

Aricoma, 13000', Dpto. Puno, Peru.

two rolling, & later 2 defeating side by side on rails of experiment, tails horizontal. One finished & rejoined group before other. 12:20, still light snow, I saw 11 of ~~22~~²³ lying prone. 5 minutes later all 24 grazing & moving eastward. All grazed diligently; snow starting to obscure vision. Snow got no heavier. 1:15, all gathered in bunch & walked quickly toward S. Pond, last trailing 100' & looking to N. as if toward disturbance. I left house 1:25 & followed. Heard whistling cry & saw 6 scattered along crest of S. Ridge. 1:35, found the group on S. shore of Pond, spread 100 yds. at 200 yds. downwind from them. Light snow & fair breeze from NE. Of 21 in sight, 2 prone & other grazing. One highest on hill & 50+ yds. from nearest one - the sentinels? - it grazed like others. 6 within 5 yds. of edge of large Pond. 2 p.m., the 6 nr. paddocked toward group, ears back on most & heads occasionally high as if smelled me. The "sentinel" descended & joined group. [prob. 07 of 07-♀ gp.] Counted 23. Increase in snow & breeze. Group started walking S, slowly. 2 sitting at 2:02 but one up as it became lost of group. Then a stir & several heads up as one chased another. Chaser had tail out horizontally. Then chaser made 3 charges at moderate speed, the others fleeing as it approached - 1's, 2's, or groups fled. 2:06, the group had been more or less driven to edge of Pond, walking almost steadily, chaser walking 15' behind group. They continued on to S. Ridge 100±' W. of Hut, one 50±' behind group & others closer. One led by 10±' but others often 3 or 4 ahead. Occasionally lost track after one or a group for 30±', head low. Fleeing ones often with ears back. Group turned up S. Ridge. I sneaked toward group & finally saw them - & they saw my head. I stopped & froze. The group ran toward me from 100

Prob. 07 of 07-♀ gp. chasing 20x 0707.

Vicuña

June 9, 1951

Aricoma, 15000 ft., Depto. Puno, Peru.

yds. to 50 yds., necks craned upward. Suddenly they turned all at once and dashed 100' away; I ducked lower; they stopped & turned about to face me. They edged along slope so that soon whole bodies visible instead of just heads. Again groups bolted 100' & I dropped to ground & crawled away (2:25). Occasionally a head peered over slope at me. I sneaked to Hut. I saw nothing as hit ground. The groups grazed 1/4 mile from Hut on dry ridge in fairly compact group. One was 100 yds. NE of group & it walked away toward S. Ponds (not one of [prob. or of or 2 6 or 7] band?). Only 22 counted thereafter. 2:43, one lay prone (up at 3:05). (2:45, saw 4 in distance descending rocky slope from near Two Huts toward Stream). Grazers face & nose mostly in same direction. Litter next to rear at 2:49. Snow almost stopped. 2:51, I rolled; down on one side, forelegs forward & back legs backward simultaneously 3X, then same on ^{other} ~~ankle~~ side, then up, humping forward to raise hind legs before forelegs. Snow letting up. Band worked southward on ridge top; litter rose (3:05). all over crest by 3:15. Snow increased; wind north. The group descended 200 yds. toward S. Ponds, onto lee side ridge. At 3:25 counted 23. I moved via roundabout way to S. Ponds. At E side jumped one, probably usual one seen there, & it whistled & squealed much as it fled around to N. side of ponds. No movement face or jaws noted as it squealed facing me. Then saw 2 atop S. Ridge & 2 more ascend. These apparently alarmed somewhat by the squealing. The near one ascended slope toward the group as I approached. At 4 p.m. I was atop S. Ridge - only 4 vicuñas there & these squealed & fled.

Vicugna

June 9, 1951.

Aricoma, 15000', Dpto. Puno, ^{Peru}

Wet snow, starting to stick to vegetation, & visibility poor.

June 10, 1951 About 8 a.m., leaving for trapline, saw group 21 about $\frac{1}{2}$ mile W. of House on lower part shale slide of S. Ridge (S. side), walking W. & up. I was 600 \pm yds. from them. Group stopped; on account of me? One went 200 yds. ahead of bunch, then back, & group turned and walked back eastward 100'; the one 50' behind group. Then they lattered in same spot 10 \pm minutes, 1 or 2 lying prone on rocks. I went on my way - apparently they did not continue up canyon (my traps there). About 8:30 saw 16 in South Pasture (1 \times $\frac{1}{2}$ mile rolling grassy area $\frac{1}{2}$ mile S. of House), spread 300 \pm yds. Probably 2 bunches as 5 \pm ran up canyon, to W., together. Another 6 on slope $\frac{1}{2}$ mile S. of Ice Falls. Cold & overcast; fair breeze from W. 8 on snowy ground (not opaque) $\frac{1}{2}$ mile W. of Ice Falls. About 10 a.m., in S. Pasture, groups 6 + 1 + 3 + 3.

NW ridge of SE Canyon. ^{TWP} ridge \rightarrow up
South Pasture

Flat, swampy

 \rightarrow N.

Ice Falls Ice midw Ice Lake upper Ice midw

10:15, encountered 5 below where 21 seen earlier. These whistled & ran slanting up shale slide, heading W., occasionally stopping to look back. Ran into groups of 8 on S. Ridge at E. foot of S. Hill; they whistled at 500 \pm yds (I retired to House). Whereabouts of the big bunch unknown.

June 11, 1951. At 7:30 a.m. 3, 1 prone, on slope of S. Ridge $\frac{1}{4}$ mile ^W of House. 7:50, in South Pasture, 3 pairs near center, 5 in group W. of center, 1 near west end. Also 5A in green

Vicugna

June 11, 1951

Aricoma, 15000', Dpto. Puno, Peru.

meadow $\frac{1}{4}$ mile NE of Ice Falls. These fled at 200 yds. from me & in single file crossed knoll of rock & descended on far side. 8:03, 5, probably same, lying prone, 200 yds. WSW of Ice Falls. Again disturbed & off in single file over rocky slope. 8:15, 2 groups of 5, 100 yds. apart, $\frac{1}{4}$ mile S. of Ice Falls. Two in flat green meadow 100 yds. upstream from Ice Falls & a second pair ^{200 yds. from first.} also there. One pair walked uphill across slope of steep shale slide on old path. 9:10, saw group of 8 at edge of high green wet meadow $\frac{1}{4}$ mile SW Ice Falls. One was prone on rocks 100' from grazing group (sentinel?). 10:00 a.m., overlooking S. basin, noted grouse of 5 + 2 + 4 + 3 + 3, east to west. / 4:50 p.m., went to Two Huts in Basin. Saw 2 take dust bath, one after other, in last rays of sunshine. Saw group 9 below road above Bend - about where 8A2K first observed. 4 on rocky slope $\frac{1}{4}$ mile E. of Bend. 7, 1 young, on flat just S. of Llana Trail above lower road. The 4 walked downhill in groups to flattest green pasture 100+ yds. from first site; one already prone in grass there so 10 present. These 10 grazing, standing, at 5:10 + 5:15 p.m., moving slowly up slope toward road. Another 4 seen 200 yds. SW of Bend. As $10 + 2 + 7 + 4 + 4 = 27$ minimum in basin.

June 12, 1951. 6:30 a.m., one atop rocky knoll $\frac{1}{4}$ mile S. of House& 3 on slope $\frac{1}{4}$ mile to N. 8:20, on green flat at foot S. side S.

ridge, 5, as yesterday morning. These walked rapidly up perhaps

shale slope, occasionally stopping to look at me & call. I


continued along near foot of S. ridge & they paralleled, 150 to

200 yds. up slope of S. ridge, & finally they disappeared among

Vicuña

June 12, 1951

Aricoma, 15000; Dpto. Puno, Perú

rocks high on S. ridge as I passed them. At 8:25, in S. Pastun, groups of 6+4 (near center gray knoll)+2+2+3 visible = 17. at 8:45 saw 2 at edge green flat above Ice Falls, where 2 pairs seen yesterday. / 3:15^{pm}, left House for Basin. 3:22, upon reaching ^{crest} of S. Ridge, heard whistle + saw 3 on ridge 100 yds. from + 20' above me. Two adults + one young (yearling?). Adult with line between 2 shades brown on sides, so this not result of shearing. Only one adult called, this apparently most distant from young. Whistling call: re, do, la, sol, in about 4 seconds, with mournful tone. Youngster grazed some; adults did not, after 5 minutes (I telling in plain site right), they walked away + uphill over into basin, youngster 20' behind second (3:29). Earlier youngster scratched side of neck with tip of toe of right hind leg for 5± seconds. I continued toward Island Pond (nr. 2 Huts) + at 3:40 encountered 4, 300 yds. toward sun, near pond W. of Island Pond. / Noted 10 below upper road near Vsiacha slide where seen last evening. On damp slope, spread 100' / 3:43, one of 4 prone. Fair NE breeze. Then 2 more prone. All 15±' from next. 3:45, last up rolled in dust, then lay prone. In this pose, back is straight + neck slightly forward of vertical . The 4 faced me. / 3:49, of the 10, at least 9 in sunshade, barely. Working S. / 3:55, one of 4 rolled in dust, then up, shook (4X in 1 sec.) ^{body} bridge, walked out of sight. Then second rose, then another. Then last rolled in dust + rose. Then other 2 rolled. As rise, hind legs up first + tail raised to horizontal as if with effort of rising. Then lattered, grazing a little. 4:01, one prone again. I moved toward group. Prone one rose when I did. The 4 appeared on ridge, standing, heads high. at 150 yds. one whistled; at 100 yds. they ran slowly. Ran across my path, 100 yds. ahead, some going fast to do it. They ascended lower slope of S. Hill, single file, until in the

Vicugna

June 12, 1951

Aricoma, 15000', Dpto. ^{Puno} ~~Arequa~~ Perut

rocks above pasture. 4:15, I was on rocky knoll near center of Basin. Saw 7 on slope below upper road between Viscacha Hids & Bend. There same 4:30 - more where 7 near Trail last evening. 4:35, in canyon near Summit, groups of 6, 3, & 6, each 100± yds. from other. All in shade though sunshine within 50 yds. of some. One rolled. 4:45, a truck descended road. Of the 7, within 100 yds. road, walked down ^{slope} ~~slope~~ 100±', then broke into run after truck passed & slanted down slope, single file, roughly parallel to truck. The 4 on S. Hill had descended to green grass & were grazing. Then, of the 7, one ran, tail horizontal, 100' from bunch, pursued by another. Stopped; rear one approached stiffly & put nose to tail other (?). The 2(?) leaped back quickly with one foot and moved several steps forward. This action repeated 6±X, then all grazed peacefully. 4:55, the 7 descending toward bottom of canyon in file. I started toward House. Of the 4, one whistled, sawer, at 300 yds. 5 p.m., fog coming up canyon reached Basin. The uppermost 6 near Summit were now 10, the lower group still 6. The 7 on lower S-facing slope.

June 13, 1951. At 6 a.m., 5 in green mdr. 1/2 mile WSW of House as last 2 mornings later (also at 10 a.m. June 14). Left in jeep. Saw 3 (1 yearling) (same bunch as yesterday p.m.?) near S. Ponds. They paid no attn. to car until about 100 yds. distant, then ran hesitantly up slope. In North Canyon saw bunch of 5 AIT, as first day (May 24th) came to this area, & flock 100± alpacas grazing to within 100' of the vicuñas. In Basin saw 7 near stream below Bend,

Vicuña

June ¹³ 14, 1951

Nr. Macusani, Dpto. Puno, Perú.

doubtless same as seen last evening. We drove to Cuzco, then to near Pucallpa & on road to ^{Macusani} Lumbini. at about 15000', ascending, saw group 6 on short grass hills. Summit 15700'. On Macusani side saw groups 3, 3, & 1 ^{in vast} ~~short~~ short rolling pasture. Returning, on Pucallpa side summit saw 6 & 3, & when nearly to main road saw ^{all} 4 close to road.

June 14, 1951.

Aricoma, 15000', Dpto. Puno, Perú.

Left House about 10 a.m. for trapline. Encountered 5, as last 3 days, in green mdr. 1/2 mile WSW House. Saw 2, 1/4 mile to E. of there at ft. of S. Hill slope. Then, from a prominence overlooking S. Pasture, saw groups 25 (or +) at east end of pasture, 21 others in pasture, 2 at Ice mdr., 9 (at least 1 young) on green slope W. of Ice ~~and~~ Lake, in all 64 & doubtless others in S. Basin uncounted at this time. At noon the 2 (^{first} ~~mentioned~~ ~~mentioned~~) still at same green spot. One group of 7 in S. Pasture (W. end) had 1 young.

June 15, 1951. at 7:30 a.m., group of 7 near east end of S. Pasture. 1 on slope 1/4 mile WSW of House. 13 about 200 yds. E. of Center Knoll of South Pasture. In green meadow where 5 seen last few mornings, only 2, & 2 more 200 yds. to S. 5 near Ice Falls at 8:15 and 9:15. Two in Ice mdr. at 8:15. 9 a.m., 9 on slope W. of Ice Lake as yesterday, including one young. At 10:30 left for Cuzco. Noted 100+ alpacas but no vicuñas in North Canyon. Groups 5 & 3 below Bend near stream. None seen near Summit. Where road crossed outlet of Lake Aricoma saw about 20, the largest bunch having about 7 adults. One

Vicuña

June 15, 1951.

N. Crucero, Dpto. Puno, Peru

of their bunch ran after another, tail horizontal & head below shoulders, several times. About 5 miles before junction saw a group of 4. Between junction & Crucero saw group 6A2V, the young of this year. Returning about 1:30 p.m. saw this same bunch, & at least 2 in area where 4 had been. Near ~~foo~~ place where road crossed Aricara ^{outlet} saw groups 6+4+5+1+1, the bunch of 5 at the very crossing as if had been at water. Another one largely gray from mud (dry). About 1/2 mile further toward camp saw group of 16 ascending slope to right of road, this group including 2 young. Noted none in Basin. Alpacas gone from North Canyon. The usual one about 200 yds. N. of House, & shortly after noted 3 (one yearling) about 1/4 mile NW of House (usual group).

June 16, 1951


Aricoma, 15000 ft., Dpto. Puno, Peru.

On way to traps, 8:10 a.m., in S. Pasture saw groups, east to west, of 4, 3, 12, 4 (Center Knoll) 5, 4, & 2. The group 9 about 200 yds. up slope (green, wet) to crest of Upper Ice mdr. By 8:50 there were 200' downhill. At 11:10, the 9 on Upper Ice mdr., one 200' from others prove a steep rock knoll (sentinel?). At 3:15 started watching 3 about 1/4 mile W. of House (there at noon). One scratched upper foreleg with tip hoof, hind, same side. Seldom over 30 sec. without moving a step forward. Cud chewed back L-R & R-L. Rate of chewing about 2/sec. 3:25, 2 about 6' apart, 3rd. 15' distant. All feed vigorously, tails down, ears about vertical. Occasionally, every 30-40 sec., head up

Vicuña
Chinchillito

June 16, 1951

Aricona, 15000 ft., Dpto. Puno, Peru.

for several hours. When feeding, neck, ^{ear} ~~cast~~, & head in constant movement, short jerks, as with each bite of the short grass. Solid downcast; occas. ^{or?} ~~solid~~ single flake snow; fair breeze from E. One ~~appear~~ ^{or?} more reddish & larger than other 2 (furthest separated), & of other 2 one smaller than other. ♂ put neck to ground as if to scratch, then rose & rubbed back of one ^{hind} leg (heel area) with anterior part other leg, not hoof (3:33). 3:35, ♂? lay on side, forelegs forward & hind backward 3± x, neck rubbed on ground, then rose. Then ♂ looked toward me (200 yds) & raised head (straightened neck) & gave faint whistle. Rubbed anterior angle one heel  on back of other hind leg. Again lay on side & rubbed on ground, showing back head & neck back. Then up & grazed diligently (rapid shakes, & quick stiff shakes whole body, after first rolling). 3:40, ♂ (no doubt), went 10' to fence side, seemed to get in certain direction (posterior downhill), spread hind legs about 110°, tail horizontal, & defecated, about 7 groups pellets dropping. Retained stance 20± sec. in all, then returned to grazing. Penis & testicles in bulges visible when raised tail; no urination noted. Other 2 continued grazing. Movement ft. RF, LR, LT, RR, in slowly waving along in grazing. 3:48, yearling, then ♀ defecated, all on same side with rear downhill. Slight crouch as well as spread of hind legs. Urinated simultaneously with letting droppings fall. All then walked up and across slope behind rocky prominence which hid them from me (3:50). All to top S. Ridge (100 yds. more) & grazed, but soon (3:53) ♀ 100 yds. down slope (& to E), where started to graze on short dry grass. ♂ & imm. descended higher on slope, not together. ♀ moved on 100' & fed. Imm. joined it (10') & ♂ fed higher on slope. Imm. larger hair than ♂ & no line of division (between ^{upper/lower} axillary & inguinal light color) on sides between longer

lighter than above & darker under below.

Vicuñas

June 16, 1951

Arequipa, 15000', Depto. Puno, Peru.

[? CK]

lighter hairs above + shorter darker below line (4 p.m.). Returned to watch
 at 4:20, all same relative posits, ♀ furthest downhill, imm. 50' uphill,
 ♂ 50 yds. above. ♀ put nose to rumen 6" anterior + to side of anus, lifting
 hind leg + bringing it forward somewhat in process. Group progressed
 50 yds. to E. (slightly downhill) in last 20 minutes. Occasional snowflakes;
 light steady E. breeze. 4:26, ♂ uphill as ♀ + imm. down. ♂ ~~defecated~~ defecated
 on dark pile at top ridge. ♀ + young downhill briefly. ♀ paused
 to sniff at pile droppings but did not defecate. ♀ + imm. (4:29) graze
 near foot slope, ♂ 50 yds. uphill. Snowing steadily. Vicuñas seemed to
 pay no attention to snow. Returned to camp. At 5:00 + 5:30, I saw
 the 3 at about same spot as before, still grazing, their bodies
 whitened by the wet snow. Ground opaque white.

June 17, 1951. At 7:30 a.m. saw the group of 3 about 50 yds.
 E. of where seen 3:15 yesterday, 200 yds. from where seen 5:30 last eve.
 ♂ was 50' yds. uphill from ♀ + imm. At 200 yds., ♂ called upon seeing
 me. At 8:05, on way to traps, saw 5 at S. ft. of S. Hill, 300' yds. E.
 of where 5 usually seen in a.m. Light S. breeze. 8:25, overlooking
 S. Pasture, saw only 9, all E. of the Center Knoll. Ground 1/2 opaque
 with snow. 8:30, saw 4 about 100 yds. S. of Ice Falls. At 300
 yds. one called at me. 8:35, saw 3 below Chinchillula Cliff at
 edge Ice M. dv. 10:10, in S. Pasture saw 5 east of Center Knoll, 42
 and 7 to west. Snow gone from most of pasture. 10:25, saw 5
 where seen at 8:05. They whistled when I ²⁰⁰ yds. away + started
 angling uphill to on shale slide. 10:35, usual one 100 yds. N. of
 house, 20' from pair of geese. At 2:20 p.m., the 3 near house
 atop S. Ridge, & about where first seen this morning
 at 4:30 p.m.

Vicugna

June 18, 1951

Aricoma, 15000', Dpto. Puno, Peru

at 7 a.m. a group 39 seen on S. side of S. Ridge near S. Ponds. One behind others, occasionally chasing one or more & others running. Another 6 atop S. Ridge, 200 yds. from group, paid no apparent attention. The rear one, tail horizontal, head low, chased several individuals in succession. Group rounded S. Pond & started S. on slopes to E. of ^{S.} Pond. At 7:15, turned back northward, again one in rear chasing others. 7:25, nearly to outlet at NE side S. Ponds, group gathered within 70 yd. down & one 50 yds. S. of group (chaser). One to outlet stream & others followed, string out. Rear ♂(?) chased mildly. 7:30, all grazing peacefully near outlet, none apart from group. Clear morning & calm. This is same place where 26 seen grazing a week or so ago. 7:35, group spread 100 yds. One prone, then 2 more. 7:40, 6 prone. 7:42, 8 down, 4 on their sides, one with side neck & head also on ground. 7:44, 10 ^{down} lying, 6 with neck & head on ground. 7:45, most stop grazing & look toward House as Mary return (600± yds.), then continue grazing. 39 still. 0754, 20 down, but at 0758 only 9, & some bunching to N., rear 7 all down. (I to traps. M.K. said she disturbed nearly by this going to & from her traps.) at 8:05 saw 4 about 1/4 mile SW House, 300 yds. S. of base S. Hill. (Usual 5 not present on this part of them). 8:20 overlooking S. Pasture, saw groups, east to west, of 7, 5, 5, 6, Center Knoll, 4, 5, & 2. Warm & nearly calm. Also 4 low on far side SE Canyon. 8:30, 5 at foot of Ice Mdw., 9 (1 young) on upper Ice Mdw.; 4, 200

Vicuña

June 18, 1951



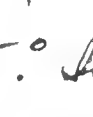
Aricoma, 15000; Dpto. Puno, Peru.

yds. S. of La Falls. 7:20, 9 still on Upper Ice Mdw. — same at 10 am., one 100 yds. from rest atop rock knoll (lookout?). 10:10, overlooking S. Pasture, saw 3, 4, 6, Cattle Knoll, 5, 5, 5, 5, east to west. Back at House 10:30. Many said that of the 39, 25 lying at 8:25 (2 on side). 8:55, 5 lying (1 on side, others prone). 9:00, group left unhurriedly toward Ponds. / At 11:30 searched 30 min. for group near Pond but did not find. At 12 + 12:15, chetris near house at a green damp slope on S. side of S. Ridge, the ♂ prone on rocks above feeding others. all 3 feeding there 12:30. 3:50, I to a nearby hill to watch the 3. Set up telescope 150 yds. down sun & cross wind from them. ♂ or ♀ stopped feeding & looked my way several times, & a few times single long whistle heard. They moved 50 yds. away in unaltered fashion & continued feeding. Chewing 1/2 sec. / each. ♂ 100' uphill from min. which is 50' from ♀. At 4:05, all away 50' by now, ~~rather~~ almost, ♂ moving first (checked sex; occasional rear view black penis). First move: RH, RF, LH, LF. Penis also visible ∇ from side at times. 4:10, ♂ defecate & urinate simultaneously, about 5 clumps excrement falling, & maintaining stance 5[±] sec. after completion, looking about, then moving off & gradually lowering tail. In stance, several small steps taken in getting hind legs spread, some downhill. Defec. & urin. start simultaneously & finish about same time. ♂ moved 50' further away. ♀ + urin. uphill to join. Earlier, when group ^{Thiokorus} ~~retreated~~ (thiokorus barks) flushed & squealed near me, vicuña raised heads & looked my way. 4:18, urin. defec. on same pile ♂, first 2 lumps, then squealed spread hind legs further & urinated, urine stream angling posteriorly & behind hind legs — so a ♀. Urin. put head over back &

Vicugna

June 18, 1951.

Aricoma, 15000', Dpto. Puno, Peru.

rapidly nibble 10±x at lumbar region. Group in shade of ridge. 4:24, ♀ urinate (defecate?) on pile 100' from other, urine stream angling posteriorly behind hind legs , hind leg squatted 1/4 as done. 4:26, ♂ now atop S. Ridge in sunlight, other 2 50 yds. downhill to SE in shade, urin. with ♀ as usual. In walking, see hind leg hit ground fraction of second before foreleg that side; almost simultaneously. ♂ along ridge 50 yds. + descends on S. side crest to foot of rocky area + 50 yds. uphill from ♀ + urin. In urin. 50 yds. from ♀ + grazing in opposite direction, ♀ slowly progressing across + down slope. 4:34, urin. runs up behind ♀. ♀ puts ear back + walks quickly forward. ♀ raises hind rt. leg from ground as puts neck around rt. side + nose to go belly region ^{3±} sec. 4:41, group moving E., more or less together, ♂ not ahead but initiating moves. ♂ defecated again + urinated same time, at different spot from the 2 previously used this p.m. Move farther E. on ridge, ♀ leading, ♂ in rear, feeding. Now 300 yds. NE of where started watching. 4:45, sun set on me, earlier on vicuñas. ♀ often used ear back when urin. close. 4:50, urin. defecated on another pile, only one hump falling, tip tail drooping before tail down. ♀ put head down + back + scratched it with hind toe, then spread hind legs + defecated (15±, small mainly), then urinated, stream curving . Front legs tensed backward in stance . Tail Tail up 45°. Immediately left the pile (same as urin. used) + started grazing again. ♂ now (4:55) 50' to E. of others. Its head down as long as 30 sec. before up for a look around (4-10 sec., or more). All 3 gave sudden start + ran 4± steps, then calm again. 4:58, ♀ lay on side on short dry grass + worked legs 3x, then up, then down again 3 times, then pause, then 2. Forelegs ^{forward} on hind backward, both somewhat flexed, simultaneously, + each on

Vicuña

June 18, 1951.

Aricono, 15000', Depto. Puno, Peru.

side thru road. Then up + shake body (4, rapid, all at once), then kicked back one hind leg. All put ear back + acted nervous, then off (5:01) at a fast walk down crest (to E.) S. Ridge, or leading. One rare occasion one flipped tail up. 200 yds. down ridge by 5:03 & still going; out of my sight. —

June 19, 1951. Left 9:15 a.m. for traps. The close trio was 200 yds.

^NSW of House on gentle wet green slope (saw at 10:30 a.m.).


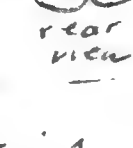

2 others 200 yds. SW of House. 3, 1/4 mile W. House at foot of S. Hill. At 9:40, overlooking S. Pasture, saw 3, 3, 3, 5, 5 (1 young), Center Knoll, 6, east to west. 9:45, see indiv., groups 3 & 5, showed alarm & fled at 400 yds. 9 in group on upper see indiv.; then walked away as if disturbed by me at 1/2 mile. 10:40, there 9 200 yds. further up slope from where first seen. 11:00 a.m., 7, 1/4 mile NW House (where 3 yesterday noon). a group of 24 on short dry grass at E. end of S. Pasture. At 4:15 p.m., saw 5 at S. ft. of S. Hill about 1/4 mile W. of House. 5 p.m., saw 5 about 300 yds. SW of Two Huts. From S. Ridge I could see none in Basin toward Summit. 5:39, the trio at foot of their favorite slope, 200 yds N. of House.

June 20, 1951. Went to traps near Ice Lake & back (0930). About 7:30, 5 on shale slide below Mary's traps (1/4 mile W. of House). About 8 a.m., overlooking S. Pasture, east to west: 3, 10, 3, 7, Center Knoll, 5, 2. 4 on slope S. of Ice Lake. 5, below me, raised heads at 1/2 mile & then walked away (S. Pasture). 9 high up on upper see indiv. (one young). About 9 a.m., overlooking S. Pasture, saw 3, 5, 3, Center Knoll, 5, & 5. About 1/3 lying down. Below Mary's traps, 9 a.m., groups of 5 & 4. The 5 ascended across shale slide, the

Vicugna

June 20, 1951

Aricoma, 15000', Dpto. Puno, Peru.

other 4 remained on grassward. The familiar trio on their usual slope on S. side of S. Ridge, near crest, the ♂ lying prone on rocks above ♀ & imm. Went up road to look for vicuñas. Saw 4± above road in canyon S. of stream. 100± alpacas in N. Canyon. 11:00, saw groups 10 + 3, 100± yds. apart, below Bend near stream (200 yds. E. of Gray Rock). 11:30 I heard squealing like dog being stepped on. The 3 running fast from near the 10. Shortly after, more squealing, one of the 10 chasing away an 11th, the 3 others as before. This chaser also chased 2 young back to group with a feint. The chaser rolled, throwing itself almost onto its back. The 11th also rolled, 10 yds. away. Occasionally 11th seemed to be trying to join group but chaser stood between group & intruder (redder than any of group). 12:00 Group moved 100 yds W. 12:00, young suckling, ♀ with legs spread & somewhat bent as in urination but tail down, young facing ♀. 12:30, I went to Gray Rock to watch. Cold easterly wind. All but 1 lying prone (on side) at 12:38, & the group of 3, 100 yds. beyond, also prone. 9 of the 73 faced down canyon, into breeze. One imm. alongside adult and other 6' distant, without adult. Imm. have short snout & light tan area centrally between eyes & at top base snout. Sitters chew short cud, almost exactly 1/2 sec. per chew, alternating sides with lower jaw. In prone position, heels touch posteriorly & cover the distal part tail  12:45, one stretches neck forward, lays chin on ground  but not throat or neck - and half closes eyelids; ears vertical.  In 12:47, the imm., now left by adult, in similar pose, ears P. Imm. sly-gier than adults & lack "two tone" tan on sides. Neck shorter than adult. This imm. raised head & neck, then put forelegs forward & flat

Vicugna

June 29, 1951

Aricoma, 15000', Depto. Puno, Peru.

on ground, one after other, so that they stretched forward alongside each other as if in a stretch. Retained this pose (12:50). 2 of 10 up + feeding again 12:50, + all 3 (now 4) of other group. The 4 graze within 15' diameter. 12:54, imm. still legs forward but now 6" apart at hoofs. One was

lying on side; changed to prone + stretched neck out + put chin on ground. Side view prone: neck longer



leg further back. 1 p.m., 3 feeding



of 10; one on side but head up + other prone.

One on side rubbed neck upward on side on ground; 2 min. later shifted to prone without rising, then sagged to side within 2 min. 1:04, a 4th of the 10 up + grazing. Whole group within 100 yd. diameter. Furthest down gentle slope, + reddest of group, ♂, twitched tail, soon lay on side with neck on ground, still chewing. Gave a start as if insect bothered + 30 sec. later prone again. 1:09, one of other group prone (gray dusty body), + another lay prone, one four uphill, other down. 1:10, one imm. up. Walk to a ♀. Start nursing, 45° from direction ♀. ♀ tail down, hind legs little spread. Imm. neck bowed. Nursing 3± minutes. ♀ sniffed tail of young before allowing it to nurse. Two ♀'s defecated + urinated. One defec. first, turned about, urinated. One ♀ worked forefeet up + down alternately 10±x on defec. pile before spreading hind legs. Both imm. defecated, one at a time. One defec. 5±' from pile, then to pile + again. Tail slowly down as walk from pile. All 10 standing 1:15. Then one imm. prone, then adult, then other imm. (1:17). Of group of 4, 3 prone. 1:19, one walk 10' up slope to pile, stand on, no sniff, with nose to pile 5±x, walk forefeet up + down 10±x on pile, then spread hind legs + defecate (no urine seen). One prone - first left wrist, then right wrist down, then hind knees simultaneously, then forelegs

Vicuña

June 20, 1951.

Aurama, 15000', Dpto. Puno, Peru.


down remainder; so 4 prone 1:22. One prone imm. put foreleg forward on ground + nibbled at medial side 10⁺ sec. When feeding, head moves up + down about 1/2 sec. intervals as if with each bite. Another prone - same manner as former, forewrist one after other, knees slowly but simultaneously. One up, so 4 prone (incl. 2 imm.) 1:27. Two of groups seem to show "two tone" side line not at all, yet appear adult. Of the 4, 100 yps. 5 of 10, 3 prone + other grazing (1:32). The imm., 8' apart, facing opposite directions, chew cud about same speed as adult. 5 of 10 prone 1:36. Sky 9/10 overcast so shady. When prone, neck forward of vertical, some up to 45°, + ears back 0° to 45° . Chewing cud, jaw , hesitating at center so a double ~~h~~ wobble effect given. Lower incisors always on cud chewed. The unicolor adults color of young - not reddish. 1:40, one imm. moved 20' + again prone, 6' from + facing adult. Imm. seemed to be chewing at grass, neck outstretched. All but imm. + 1 adult up as the group 4 ran 50' as if from some alarm (one of the 4 redder than the others). One of the 10 (or?) ran toward the 4. Within 3 minutes the 4 back away from 10 + all peaceful. 1:45, only one unicolor of the 10 prone; others grazing - this one up 1:47, turned about, + down to prone again. One feeds on plant growing in rock crevice. Close enough to see plants eaten but would have to disturb group to ascertain. Very short posture, not tufts, seem to be eaten. Heads turned 30° to side occasionally in eating short stuff. 1 of other 4, 3 grazing, 1 prone + cud chewing. One imm. raise with a start as butterfly a leaf goes past. Imm. feed 4' apart. About 1 minute longest interval feeding before head up for 3⁺ sec. as if for a look. 2:01 p.m., still same one prone, other 7 grazing; 2' prone of other group 4.

June 21, 1951. Cold wind down canyon; clear. 4pm leaving house in

Vicuña

June 21, 1951


Arica, 15000', Depto. Puno, Peru.

jeep for road, saw close trio about 200 yds. NW of house, single one about 200 yds. N. house, & one running fast from the 3 toward the 1. The 1 had run at approach of jeep, & the other (♂?) seemed to be chasing, tail long out. Upon reaching Loop, saw 6 (1 ♀) in swampy area 100 yds. NE of water fall. Another group 14 below road near stream; there walked down canyon. One individual, at about 100 yds. N. of the 5, ran fast up canyon, cutting around rocks, alone. 8:25, in N. Canyon, saw group 6 (1 ♀). One, 200 yds. down canyon from group & on rocky knoll, squealed again & again (♂?). The group started down canyon. 9:35, at Bend on road, saw 5 to 5. in wet bottom. Two singles further upstream toward Gray Rock. 5 in group across ~~stream~~ first gully (to 5), 1/4 mile from Summit. One came up canyon toward 5 as if aggressively. One of 5 descended toward it & newcomer walked uphill past it. Upon reaching group, newcomer wagged tail side to side, then ran downhill; all followed, but 3 stopped after 100 yds. Three went rapidly down canyon, not close together, sometimes running fast with tails horizontal. They seemed to go toward the lower group 5. Once saw 2 individuals apparently racing after a third. Action obscured by rocks. 10:10, a fourth joined upper group of 3. This one apparently came up canyon in next draw 5, then descended to group. One imm. in this group. By 10:30 a fifth in group, on slope small rocky knoll, chewing cud (♂-ad, large). 10:40, about 1/4 mile down canyon saw one on rocky knoll, gazing intently at distant object, tail . Suddenly it got began moving nervously, then ran 100 yds. away before stopping. Another vicuña appeared near first point (from direction group 3 or 4). First then stood on another rocky prominence & looked toward second, after 5± minutes the second ran fast toward first, & first ran when 2nd.

Vicugna

June 21, 1951.

Ariconia, 15000', Depto. Puno, Peru.

at about 100 yds. distance. Head stopped, first opened distance to 200 yds. Head slowly back to group; first returned to about 200 yds. from group. Much long running & long range chasing today! 10:55, of down group, ♂ down down off rock & grazing, another prone, & imm. out of sight. 10:48, prone rose. One defe. & unim. down slope, & immediately after imm. defe. on same site. Group walked 100'. One lay prone on spot gray bare ground. Imm. lay prone 10' from it, both facing down gentle slope. Suspected ♂ remains 30±' from group. Prone adult lay on st. side, neck & chin on ground in front, legs . Individuals occasionally shake head side to side 4±x as if to remove fly; not ~~vibrant~~ ^{violent} shake. 11:07, lying adult to prone by tucking feet under body & rolling upright. ♂, 11:10, stomped a hind foot twice, then dropped on backs of wrists, then on side & threw neck back 3x; at least ~~once~~ ^{once} on ~~other side~~ ^{side}. Then up & grazed by rock; saw 8" dry straws protruding from mouth. 11:13, same & another adult prone. Imm. ran toward ♂, tail vertical; perhaps defecated near him. Then all ran 20±' down slope (prone rose) as if from some alarm. After 30± sec. returned to grazing. 11:17, one walked slowly uphill & crunched prone on ~~same~~ ^{same} bare spot one on previously. 11:21, this one gave a roll, then rose & walked down slope. Another walked uphill to same bare spot, put nose to it, turned about, & ~~assumed~~ ^{assumed} prone position facing downhill. After ~~last both~~ ^{rolling}, ♂ shook head, then body - 2 separate acts. 11:25, two threw noses high & came back, moved necks back & forth, & took a few quick steps - as if smelled an ^[prob. mild blowing encounter] enemy. Within 15 sec. back to grazing. 11:30, second of 5 prone, imm. not in sight. Upper (largest) prone rose & walked slowly downhill. It rolled at same spot as ♂. Other prone rose as fr it approached. Both walk downhill. Group now 400± yds. NE of where first seen.

Vicuña

June 21, 1951

Aricona, 15000', Depto. Puno, Peru.

Today. Minn. wandered 50 yds. from group. One came running up canyon & to group (behind hill); 2 others stayed 200 yds. down canyon. Then one ran uphill from group & stood on rock, tail arched. Soon ran uphill & second appeared where first had been. Second leaped ^{100'} toward first & first ran further uphill. Second then returned toward group (out of sight). Soon ~~minn.~~ walked & ran from group & uphill toward where chased adult had disappeared (200 yds. from group). / 11:50, a group of 4 came up canyon. 4 others going down 1/4 mile away. One of second group ran to ridge 100 yds. from first group. Soon one of first group ran toward it & latter ran away. The chaser remained on rock knoll. About 3 minutes later the 3 remaining acted nervous. Another (apparently one chased from bunch 5) 100 yds. away & the minn. too. The chaser chased newcomer over the rocks & grass about 300 yds., head often belly height in running, but the 2 not closer than 50' & chaser gave up & returned to the 3. The minn. had been chased briefly by the 3 but then remained among them. Before chaser returned to group, one of them chased minn. 50 yds. away. Group of 4 (not 5) then grazed peacefully. Drove back to House. / 12:20, bunch of 15 on E. side road at Look, 5 (lying) to 3rd waterfall & 5 to N. 4 on knoll 200 yds E. of Hut. at House, 4 (at least 2 ♀) grazing 100 yds. NNW of House, rather tame; & another 4 another 100 yds. same direction. 3/4 overcast. Why so many vicuña bunches in unusual places today? Move up or down canyon? / 1:40 left House for Ice Lake, 8,000' alt, occasional flakes snow. 2:00, overlooking S. Pasture, saw, E to W, 3-4-4-2 - Center Knoll - 4-5. 2:10, 3 on Ice Mdw., 14 in groups on slope of Upper Ice Mdw., & on slopes S. of Ice Lake. 2:40, still 14 on



Vicugna

June 21, 1951

Aricoma, 15000', Depto. Puno, Peru.

Upper Ice Mdw., at least 2 immatures. Same at 4:35 p.m. Saw 3 on West Ice Mdw.; fled when I came in sight 200 yds. In this area much more wary than near Road. 5 p.m., 14 on Up. Ice Mdw., 3 100 yds. S. Ice Falls.

June 22, 1951

7:45 a.m., left House for traps. 8 a.m. saw 4 below at SE foot S. Hill + 5 300 yds. WSW of them (usual place where 5). First group nibbling at sloping distichia mat. The 5 angled up shale slide in my direction, finally letting me pass not over 200 yds. down slope. 8:15, overlooking S. Pasture, saw groups, east to W., 4, 3, 1, 9, 4, 7, Center Knoll, 3, 5, 2, 5, 2. Clear; light SE breeze. Two ran by, 100 yds. below + not seeing me, occasionally stopped, + continued on 1/4 mile + to E. as if looking for another; one of 2 100' behind other. / On S. Pasture saw 4 grazing with "sentinel" 150 yds. away on rocky knoll. 3 others approached "sentinel" from direction away from group 4. One of 3 lagged 50 yds. behind other 2. The 2 approached "sentinel" - it gave vigorous chase, seeming to chase only one, head low, first part chase in 50 yds. down. circle among rocks. Once hurdled rock neatly. Chased down slope, 3 stopping after 300 yds. + "sentinel" walking back uphill. / 8:35, 5 in Ice Mdw. + remained in line + other advanced 50 yds. toward me (as if to challenge?). All away slowly, closer 30-50 yds. behind groups. They remained 200 yds. from me several minutes, then over ridge; "sentinel" last and atop rocky knoll. / 9 a.m., 3 AIT on slope S. of Ice Lake. Whistled at me at 500 yds. Light E. breeze. / None seen on Upper Ice Mdw. at 9 a.m., but there at 10 a.m. 12:30, group of 14 (21) there. Returned to House.

June 23, 1951 10:45, on way to traps, saw 5 300 yds. S. of

SE ft. S. Hill. 11:00, overlooking S. Pasture, saw, E to W., 26

(some chasing), 3, Center Knoll, 3, 5, 5. 11:10, 5 at ft. Ice Mdw.,

Vicugna

June 23, 1951.

Aricoma, 15000', Dpto. Puno, Peru

2 at ft. In Lake, 1 at ft. Upper In Mdw. (the 1st not present).
 1:30, returning from traps, saw 4 at SE base S. Hill; they whistled at
 200 yds. & ran away. / I went to watch the nearby trio. Fog, surging
 up canyon, 4°C. 4:50, just after sunset, the 3 were on S. side crest S.
 Ridge. All ran 100 yds. to ft. ridge, perhaps stimulated by sounds of truck
 going go down road. All grazed vigorously, 50' from small pond, standing
 on mostly green vegetation. By 5:15 the 3 had moved 50 yds. S. & ~~at~~
 9+ mins. together, or 100' behind. Grazing among Pycnophyllum &
Distichia. I once put my eye to flange & milled rapidly 10⁺X. 5:30,
 9+ mins. not over 10' apart last 15 min!; or 50 yds. distant; all
 graze louse-like. 5:35, or walk toward others, stop at pile
 of waste, then past others (2 geese had walked to within 100' of), stopped
 & ^{gave} 3 sec. long whistling call — sol^{to} sol, toward
 2 dudes quacking & whistling 100 yds. away; then all grazed again,
 within 10 yds. ^{distance} ~~at~~ At sneeze from me, adults raised heads,
 or up longest (15+ sec.). Then adults turned heads toward duck sounds.
 Then all walk slowly back way came for 200 yds. & grazed
 on lower slopes S. Ridge. One went to pond & apparently drank,
 standing on edge, head reaching down to water 1' below. All grazing
 5:45; getting dark.

June 24, 1951. Shortly about 8 am. saw 3 near House, atop
 usual slope, 1/4 mile W. of where last seen yesterday. 2 at ^{SE} base
 of S. Hill. 8:30, at least 9 (8 down) on Upper In Mdw. slope.
 South Posture, east to west, saw 4-3-4-Center Knoll-3-6-
 5-4-5-2. Of these, 5 near In Falls, 400 yds. from & 100'
 below me. These called at me. 5 at foot In Mdw.
 8:45, saw 12 were in bunch at Upper In Mdw.,

Vicugna

June 24, 1951


Aricoma, 15000', Depto. Puno, Peru.

two creamy young. at 600 yds. about $\frac{1}{2}$ looked toward me, across canyon. 10:15, still in same place ^{upper} ~~top~~ Ice Mdr., only one lying down, spread 50 yds. 3 (1 young) on slopes S. of Ice Lake. 10:35, @ 200 yds. S. Ice Falls (where 5 earlier). 10:40, overlooking S Pasture, E to W, 3, 4, 5, Center Knoll, 5, 8. 11 a.m., again saw 2 at SE base S Hill; these ran to E. Then I saw 300 yds. N'NW of House where usually 3 (1 of 2 join?). 4 p.m., noted a group of 2 @ about 250 yds. S. House. No young but about 10 apparent yearlings (shaggy, not broad sides, smaller). I watched from 200 yds. toward sun. They seemed not disturbed by me, or by voices at camp. Many nibbling at top of Distichia mat; others at nibbling close to ground among short near-dry grass. 9/10 overcast, some fog coming up canyon 4:20. Group spread 75 yds., all feeding vigorously & paying little attention one another. One stamps hind foot, rubs front of that ankle on back other hind leg. 4:25, one ♂ defecate, then another (prob. ♂) same place, & ♂ different spot. None seen to urinate (♂ harder to see as stream small & in shadow body). One, in defecating, anus dilated to about 3" diam. & mass protruded like pack of grapes; maintained stance 20 sec. after defecation. Two put noses near belly of one large reddish one, just anterior hind leg. Big one scared them back with slight move, kicked back with one hind foot. The big one chased several mildly & briefly. Once raised both forelegs, knees bent, as if about to mount a smaller one (ets ears back; submissive looking).

Vicugna

June 24, 1951

Aricoma, 15000', Depto. Puno, Peru.

Big one put chin to ground, then forelimbs, rubbed neck sideways on ground, walked 3⁺ steps on knees, rose. Again down & walked 3⁺ steps on forelimbs, then down on side, thrashed legs, & up. 4:35, this one walked up ridge & disappeared over, 50⁺ yds. from group. 4:37, one lying. One scratch chin, tip hind toe, head low & ventral. 4:40, another ♂ defecate. 4:43, all up, working up slope now. At distant vicuña whistles, several heads up, but for not over 10 seconds. One raised hind toe to posterior lateral ribs  to scratch 10⁺X. One scratch upper foreleg 10⁺X with tip hind foot. 4:55, 2 defecate, anus downhill; one remain in stance 30⁺ sec. after defecation finished, tail up /, ♂? Sunset 4:55. 5 p.m., all but 5 had wandered over top hill, away from camp. 5:02, 2 defecated before moving on, nearly same time, on 2 piles 8⁺' apart. Some nosing near pile before & after. One urinate after defec. for 30⁺ sec., moving on as soon as urinate stopped - hard to see as stream small; perhaps can distinguish ♂ by time remain in defecation stance after defecation. ♀ stream larger, quicker, more conspicuous than ♂. Often, when ♂ tail raised, can see tip penis from rear.

June 25, 1951. 8:45, saw 30⁺ in group on east side of Center Knoll of S. Pasture; doubtless same group as watched yesterday. 5 at 5. foot of S. Hill on Distichia mat as often before. These fled to west rather than up the shale slope. 9 a.m., one, tail up, chasing the 30⁺ bunch but apparently not touching any. This group now 1/4 mile NE of Center Knoll. In South

Vicuna

June 25, 1951.

Aricoma, 15000', Depto. Puno, Peru

Pasture, east to west, saw 4, 2, 30, 3, 1, Center Knoll, 3, 1, 5, 6 (5 near Ice Falls). Band had at least 31 with 2 or 3 others within 100 yds. $\frac{2}{10}$ cerise clouds. 2 near foot Ice Lake. 5 at foot Ice Mdw. (previously startled by me?). Then over ridge out of my sight, 200 yds. away. 9:30, in hollow halfway up Upper Ice Mdw., saw 9, at least 1 young. 2 in West Ice Mdw., near foot. 11 a.m., still 9 in Upper Ice Mdw., came hollow (out of cold wind?), most lying down. 4 (14) at foot Upper Ice Mdw. 11:15, at N. edge Ice Mdw., 14, + 4 more near east edge. There actually out on the islands made by natural of water passages. S. Pasture, E to W., 3, 5, Center Knoll, 4, 5, 3, + 2. 11:50, 6 at head canyon $\frac{1}{4}$ mile NW of House where tame trio usually. One chasing another, nose toward its anus, + uttering a throaty birdlike (young jay?) shriek. Imm. grazing at ft. this draw + 1 adult lying near (or of group chasing off others?).

June 30, 1951. Returning in jeep at 9 p.m. of clear moonless night, saw 6 vicunas standing in green flat about $\frac{1}{4}$ mile N. of house. Eyeshine pale red or reddish pink. They confused by light. No evidence that they had been lying down. I believe they ^{may} feed at night.

July 1, 1951. About 3 p.m., group 25+ about 200 yds. S. of House where large groups seen a few days ago. a boy came from nearby road crew. When I told him I was catching animals, he immediately wanted to borrow shotgun and one shot to get a vicuna for me. He assumed that I killed them + seemed not to know about

31-07 flat, & name flat 30


Vicuña

July 1, 1951

Arrima, 15000', Dpto. Puno, Peru.

any restrictions on this. Two others I later talked to also seemed to have no qualms about killing vicuña.



July 3, 1951. Returning from Cruces about 11 a.m., I saw 2 near outlet stream of Lake Arsonia. Near House at 12 M saw 5 (100 yds. NW; Mary saw similar grouse yesterday), 2 in canyon 300 yds. NW house, & 1 on flat 200 yds. N. of House. About 11:30 saw 8 (♂, 1 ♀, 1 ♂) near head of Basin (near Gray Rock) - probably the 8 AZK group.


July 4, 1951. Went to watch trio 300 yds. NW of House. Arrived at observing spot 8:15. Trio (♂, ♀, yearling) grazing on S. side S. Ridge (below - SE of Indian markers on ridge). About 400 yds. to SW of these were a group 5. These latter apparently saw me sneaking among rocks - 4 ran toward me 100±' (est) and stood in line, 10'-15' apart, looking my direction, & also fifth 50± yds. from them. I watched trio. 8:28, ♂ sat prone, one forelimb down before other, then (hind feet together) hind knees down slowly, then forelegs doubled. Within 3 minutes, lying flat on right side, neck & head on ground. By 8:31, ♀ also prone, & at 8:35 lying flat on right side as ♂. 8:35, yearling down on side but neck up, ears back, chewing cud. No breeze; warm, sunny. Imm. flicked tail about. Scratched medial hind ankle by lifting leg, rubbing with teeth. 8:42, ♀ prone, ♂ head & neck up, imm. standing & grazing. When on side, legs extended rather haphazardly - ♂'s forelegs tend forward, hindlegs backward. (Of 5 groups, 3 visible, all down). ♀ with ears back horizontally, constantly. 8:45, ♂ prone, forewrists protruding & doubled in front of body  - flexion of wrists maximum. Then ♂ rose, gave a heave forward as raised hind legs, then

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up from urticated when hind legs about straight. Immediately started to graze. ♀ + ♂ (especially) plainly lined on tan sides; imm. shows nothing of this.  ♀ chewing cud, ears back, neck ; rose at 8:50. Tail straight + raised to horizontal 2 or 3x as rose. Grazing within ³⁰ seconds. Imm. to pile on slope; def. ? + urticated (sure ♀), spread hind legs down slope, then grazed near pile (50 yds. from adults). ♂ nibbled 10±x at one foreleg, below ankle, anterior. 8:55, pair move 100±' SW to greener mat, some ice on it. Move together, ♀ ahead but possibly not initiating move; imm. scampered but remained 50 yds. from adults. (Light breeze from E.). One scratch medial foreleg, at wrist, with hind hoof point 10±x. Feet seldom one spot over 10 seconds before one moved. Sitting forage seems to be with slight upward movement of head - use lower incisors? /

9:05, of 5 group 3 prone, 1 grazing, 1 ? Watching from 200 yds. from behind stone wall. 9:08 - ~~imm. remains near~~ [♂] 100 yds. up slope (N.) from ♀ + imm. adults. ♂ Uses defec. pile (5 yds. above first), then sniffs it, walks down to first pile, sniffs it, works forefoot up + down, turns so hind end down slope, pauses 5± sec. with tail horizontal (uricated ?), continues on down slope to (8:11 (9:12) 20' from ♀, imm. 15' other side ♀. ♂ head halfway back to hind legs, low, + hind leg forward, as scratch side head 10± times with hind hoof tip. Toenails ♀ appear white. ♂ has "mole" in malar region. Rate of opening + closing mouth when nose to ground about 3/second - faster than cud-chewing. ♂ rubs lateral lower hind leg with ~~over~~ other hind leg, giving single stroke downward 4±x. ♂ raises hind leg out , reaches back with head + nibbles 10±x at anterior side thigh. / 9:30, of the 5, 4 grazing + one prone. / Usually ♂ does not keep head down, feeding, over

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25 sec. before up + looks about, but once for 1 minute 55 sec. ♀ scratches posterior foreleg with tip hind hoof same side, hind leg raised high + cannon bone horizontal. Imm. nuzzles 4±x at heel, hind foot raised off ground. / 9:35, all of 5 grazing. The 5 moved slowly up + across slope 100 yds. by 9:45. ♀ put hind hoof to side lowered head + delicately scratched temple 20± times. 9:45, trio within 10 yd. diameter on green Distichia mat, imm. separate from adults. By 10 a.m. the trio off green mat onto adjacent dry short grass. Imm. scratched posterior side anterior hoof (postern?) with tip hind toe same side 10±x. ♀ put neck to ground + pushed forward, then down on side, flipped 1/3 way up onto back 3x, then stood, slightly slightly crunched + shook (4±x rapidly). ♂ lifts hind leg forward + out + nuzzles 10±x at middle cannon bone. Again scratches upper arm, posterior, with tip hind toe same side. 10:10, ♀ defecate (a third pile), turn around, put nose to pile + work forefoot up + down 4±x, turn about again, defecate, crush more in hind legs, urinate. Then ♂ sniff pile + then lift head vertically, twice (poorly seen). ♂ then defecate same pile, then imm. imm. on same pile. Imm. + ♂ then prone, 50' apart, within 2 minutes while ♀ continue to graze. ♀ may be larger? ♀ down 10:16. ♂ + ♀ perhaps mixed in some previous notes. All chew cuts, the lower jaw moving in figure 8 fashion, side to side . Fair E. breeze; clear, warm for here. / 10:25, the 5 group walking back down slope to near where first seen today. / 10:26, ♂ walked slowly up slope, occasionally pausing + grazing, until 50 yds. from other 2. ♀ + imm. ran several steps as group 6 geese glided past + landed 50 yds. away (departed 5 minutes later). 10:35, ♀ + imm. graze 6' apart, ♂

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50 yds. across + up slope. 10:38, ♀ raise head, nose high, ear back 11 to neck, & turn head side to side - as if smelled me. All 3 at edge of rock outcropping on 30% slope. ♀ + imm. (following 10') up + across slope below ♂. ♀ lies prone (10:42) on bare spot. 10:45, drops over on one side, then prone, then ^{down} other side, then prone, then rises. Just before, the ♂, 50 yds. away, rolled in dust on bare part of hill, ~~was~~ vigorously. Stood, pawed ground 3± x one forefoot, put neck to ground, then down on side and rolled to nearly on back 3± x, then up. ♀ + imm. toward ♂; all grazing within 50' diameter at 10:47. / 5 grouse standing where before but looking at a sixth 50 yds. to SW. The sixth ran uphill and across slopes of lower S. Hill, fast, toward the trio. It passed 50' above trio. The ♂, tail , ran parallel to it, then behind it, & followed to crest of S. Ridge (200± yds.) but perhaps following rather than chasing (other had tail notices). ♀ + imm. stayed put, imm. soon prone, while ♂ stayed on ridge crest many minutes, tail down. 10:55, ♀ + imm. prone, ♂ on ridge crest looking about. 10:59, ♂ ran down slope toward ♀, moderate speed; ♀ + imm. ^{ran} down slope 50 yds. more. ♂ joined & all grazed among rocks on hillside (brown grass interspersed). ♂ lifted head with mouthful dry grass 8±" long & chewed it. ♂ scratched side lumbar region with teeth 10± x. 11:10, ♂ prone - right wrist down, then left, then hind knees together, then forebody down as elbows bent. This action usually somewhat jolting, not smooth. ♀ + imm. continue feeding 20 yds. down slope. ♂ chews cud, 1/2 ^{second} ~~second~~ per chew. / 11:15, of the 5, 3 down, 2 grazing, same place. / ♂ up, walked up slope - suddenly ran up 100' as a fourth came by (from S. ridge crest - same as before?). ♂ tail



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out ~ but others not. Other across above 3, then down slope - over some rough rocks. ♂ ran down past ♀ + imm. to side of the other. Other on down slope. Then I saw that groups 5 were approaching two from 200 yds. S. One from other band 5 raced 300 yds. across grassy ground + chased this bunch vigorously, tail up. Second 5 ran toward trio & ♂ got between them & ♀ + imm. The one from far 5 ran back to its group. ♂ did not chase close 5; they stayed 100±' from trio. By 11:25, ♂ resumed grazing, the 5 standing 100' to W. of him, rarely grazing, apprehensive appearing, ears usually back. When ♂ tail arched, walked 5± steps toward the 5, 2 of them moved quickly several steps away. / 11:30, far group 5 grazing peacefully on Distichlis mat 400 yds. SW of the trio + near 5. / One of far 5 ran from group to the near 5, tail arched, & chased one (tail also arched) through several sharp turns; ^(whole group ran - only 1 was chased) then retired 50 yds. + stood atop rock knoll. The ♂ tail arched, ran toward group of 5 when it approached but did not chase. Close 5 up slope 50± yds. to foot of rock slide, then W. across foot slide, away from trio, giving lone one on knoll a wide berth (50 yds. or more). Trio had ascended slope parallel to 5, & at 11:37 followed, walking, along rock slides, going W. ~~One of the 5~~ The trio ran + closed distance to 100± yds. One of 5, tail arched, ran at the trio + chased one (all 3 fled, chased one leading). The one on knoll also chased same one of trio. The chaser of ^{the} 5 turned back to its group, & chaser from far 5 retired 50 yds. down slope (11:43). (Apparently ♂ of trio was chased.) The retiring chaser rolled on bare slope, then lay prone 3± minutes, then neck to ground, down on side, & threw forelegs forward, hindlegs backward,

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3 ternes as rolled partly onto back. Then quickly up & walked down slope. 11:48, of the intruding 5, 3 prone on slope & 1 standing, the fifth 100 yds. down slope at edge of the other group of 5. Trio remains well up slope in grassy - rocky area, 200 yds. above where fed most of this morning. 11:53, the trio prone - the 4 overlooking 5+1 also prone; the 5+1 grazing (intruder which?). No change. 12 M. $\frac{1}{10}$ cumulus; fair breeze from E. Went to lunch & returned 1 p.m. The far 5 where first seen this morning, 2 prone. The trio ^{near crest} on S. Ridge near next highest Indian marker, about 400 yds. NE of where last seen and slightly lower. Other group of 5 gone. Trio about 300 yds. up slope (to NNW) of where at 8:30 a.m. 1:15, the ^{up & grazing 1:19.} min. prone; $\frac{2}{10}$ cumulus; light breeze. Of 5 group, a third prone 1:18, all within 50 yd. diameter. Fourth prone 1:22. / Trio often hidden by intervening rocks so moved closer to 5 group, to about 250 yds. all rose & walked 50± yds. NE (winded me?). Four, in turn, defecated & urinated on one pile, each waiting politely for previous one to finish - then all ♀♀. Then they grazed together ⁱⁿ short brown grass near rocks, ♂? 100' from group. 1:42, ♂? put neck to ground, then down on side, kicked feet, & up again. Then ♂? started up slope & other 4 followed all stopped; looked toward cliffs. Then ran up hill, ♂? leading. Again they stopped at foot small cliff - I saw the attraction; a fox, 100' away from vicuñas, going ^{across} slope. Fox continued on - group vicuñas ran parallel below, leader with tail arched. Three stayed behind & two continued on 100 yds. further up & across slope. Leader came within 100' of running fox, then stopped, this about 300 yds. from starting point of group. Within 2 minutes leading one walked back toward others. At least 4 of the 5 rolled briefly on one

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on both of two light-colored spots on the bare steep shale-slide slope, the dust flew. One put ~~for~~ wrists down, one at a time, as to kneel, then turned over completely, rolling downhill, rose, went to next dust spot, again down on wrists then on side, threw neck & head back, forefeet forward & head backward $3\pm\times$, then up, walked $15'$, shook ($4\pm\times$ rapid). Two at one dust spot; one pawed ground with forefoot - another within $3'$. First bumped into second with chest or neck. Second seemed to try to back toward first to back, but did not. All walking down slope toward former grazing site 2 p.m. The two had watched fox as it approached - gone probably over S. Ridge, to N., by 2:10. ~~At 300 yds, I tried to sneak along, but at~~ ~~300 yds, I saw a rook, they saw me...~~ ~~while we were given.~~ All came 100' toward me, one ($10'$?) closer than others. This closest one sat prone $5\pm$ minutes later and seemed to watch me while others grazed beyond it. Grazing around rock outcropping. ~~at 3:03~~ The one prone did not chew and, seemed to look straight across at me almost constantly, ears back horizontally. Another prone by 2:25. 2:35, ~~one~~ up & grazed among rocks. One put muzzle to ~~entire~~ grain & nibbled $20\pm\times$, then to buttock near anus, tail T, and nibbled $10\pm\times$. 2:45, one prone as before, the other 4 having worked $100\pm'$ SW of it in grazing. 2:52, down one up & soon grazing. One rolled on one side briefly. 3 p.m., one rolled one one side, then other, then rolled over and rose. Two more rolled near same site. Forelegs flexed \gg when rolling - not actually a roll but scratching of side & neck on ground. Some prone briefly after rolling. 3:03, all grazing on short brown grass slope. 3:10, the group started single file along slope, to E. Leader & another stopped and gave a roll at one spot. Leader sniffed at dropping site and

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passed on, but followees loitered near pile and 3 defecated (at least 1 ♀, urinated). Then one stranger ran from near me toward the group. It was met by one of group, bit arched, who chased it as it moved to chase a ♀. The fighters stopped, one 6' from other, and one picked back at other rising the dust. Then member of band chased other out, stopped after 100 yds. & returned to band. Two soon rolled. Wrists down almost simultaneously and fall over sideways onto neck, then thrash legs & neck. Group walked on down slope until at 3:25 where the trio was first this morning. Bear me in file stopped on bare patch ground and thrashed. 3:30, group on another 100 yds. One gave screeching whistle or group came in sight another within 300 yds. NE of group. an answering screech heard. Group seemed to be alarmed by me but finally grazed and one ^{lay} sat prone facing me (3:40). I moved to get 400 yds. up run from group. Then at 3:50 saw a sixth 20' from one of the 5, the 4 together 20±' on other side. Movement of intruder headed off by tail switching & movement of ears back leader. Intruder started away & whole group followed. Intruder seemed to try to chase one ♀ (probably) and ♂ (prob.) chased it. all over hill to 100± yds. NNW of House. Cold in shade; clear day; fair E. breeze. I down S. ridge - to NE. One at ^N foot ridge gave long whistle at 300 yds. Four at Island Lake; ^{one} gave screechy - la - sol - la - sol - la - sol at 300 yds.; they ran at 250 yds. approach. In other group of 7 (14) near lake E. of Island Lake. The whistling below from 1 of the familiar trio. I worked back near House and at 4:20 found the 5 grazing 100 yds. N. of House on green flat, 30-50' from pair of geese, 200 yds. from familiar trio. One started back from 10±' from goose when latter ruffed top and pushed head back;

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perhaps hissed. One scratched side bare neck with hind toe, neck out to side, 15± strokes. This late afternoon feeding very steady; no lying down for rest. Sunset at House 7:50 p.m. The trio only 100 yds. beyond the 5. One scratched foreleg 10±x with hind toe. 2 (or 1) of 5 may be yearlings. The apparent or seem thicker laterally than the others. Still grazing 5 p.m. Walk over & around heads Distichia. Sometimes heads vicinior almost touching or feed. This group 5 covered area 1/2 mile x 1/4 mile today. 5:20, the 5 as before + trio 200 yds. further from house. 5:45, rather dark, the 5 starting up slope going westward.

July 5, 1951 Clear, calm. 2°C. at 7:30 a.m. Found the group of 5 ^{at 8 a.m.} within 100 yds. of yesterday 8:30 position. Tried to stalk but seen at 200 yds. Group assembled in line, running 50±' toward me, supposed or separate from others and on higher ground. Supposed or moved away, walking, + others followed. No alarm signals heard. Three of followers defecated on one pile. Group moved 200 yds. away, out of my sight. Again stalked to 200 yds. S. group but again detected when my head appeared over rocks. Hid and waited 5 minutes. (Defecating - tail may be up 30° or more, tip high, ). Group moved slowly 100 yds. away from me + started to graze on mat near edge; one lay prone ears back. At 8:40 I was 300 yds. away, watching over intervening rocks. Light E. breeze. The prone one kept head in my direction + did not chew cud; mild alarm? One scratched top head with hind toe, head low, whole leg moving in scratching, 15± strokes. Then shook head side to side 5±x, ears flopping. Then nibbled behind no hind leg, leg on ground. Then shook head again. 8:48, second lay prone

Vicugna


Peru

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5 yds. from first, both bodies facing wind, heads facing me. Neither of prone one seems to be largest of groups (2 or 3 are smaller than the others). By 8:52, 4 prone. One down on left wrist first, then right, ^[knees?] then neck, then doubled hind legs. The only one grazing may be leader.

One prone has one foreleg extended, other folded under at wrist. Another has same on both. The one extended other foreleg, forefeet together, raised neck high, raised nose and opened mouth as in

a yawn. The 4 prone face . Two of prone chew end in S fashion. 9:00, I moved ^{down hill} carefully a few feet to see better. One

gave screech-screech alarm; all rose + faced me. I was quiet.

In 2 minutes one prone + 2 grazing. Prone one faced me. Up

at 9:06 + grazed. Another prone 9:05. All groups within 50'. Prone

one shown neck back twice in rolling, then rose. One scratched side

muzzle with hind toe; much of motion seemed to be only in distal ^{but!} joint of toe.

9:09, all ^{but!} grazing. The one was same as sat facing me

after my 9 a.m. move. It seemed interested in something up slope. It

walked 10 ± yds. uphill to barish ground, worked forefeet up + down,

and defecated, ^{downhill} ~~over downhill~~. Then turned halfway, snuffed pile, again

worked feet + turned ~~over~~ downhill, + defecated lesser amount. Did

not see urination - my guess is ♂. It then walked 10 yds. across

+ up slope + stood alone grazing group; ears back, facing wind.

Fair E. breeze - more than yesterday - no clouds. 9:29 supposed ♂ lay

prone on flat grassy spot among rocks and chewed cud; others within

30' downhill, grazing. One of smaller ones "preened" for 3 ± minutes.

Scratched dorsal neck with hind foot, milked at wrist, right

huttock, left thigh. Nibbled at belly, one hind foot raised

high, cow part below heel at belly ~~are~~ level. Then shook head

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side to side $3 \pm \times$. 9:33, second lay prone 10' below first, right wrist down first, facing opposite direction from first. Three grazing appear to be youngest of group. One prone nibbled ribs at one spot $10 \pm \times$. 9:37, third prone, 15' from others, all 3 on flat grassy place among rocks. Another prone 9:39. all prone chew cud, $\frac{1}{2}$ sec. per chew. One prone put side neck to rock + gave it two ^{dorsal} ~~open~~ sweeps to scratch. Another extends one then other foreleg on ground in front of body. First to lie prone also extended forelegs one at a time. Cheeks bulge when chewing cud. One prone has prefrontal neck on ground. Lone grazer seems ^{youngest} smallest of 5. 9:55, last prone, on brown grass, $20 \pm'$ ~~below~~ from lower of others. Only 1 of 5 does not face nearly into wind coming up canyon. 10:10, first to lie prone, highest on slope, again extended folded forefoot (when folded?) and raised neck to more nearly vertical, later relaxed it. They do not look about watchfully. Occasionally one flicks tail up slightly above horizontal. 10:12, 2 lay necks on rock, one with head down half on side, other with head over edge of rock. at no move from me, all quickly up at 10:13 and walked 100' up canyon. Some grazed. 2 ♀♀ defecated, then urinated, both on same side. One (leader?) walked 50 yds. up slope from others. 10:16, others walked quickly to leader as if on signal. all grazed 100 yds. across + up slope from where had lain. 10:25, all moved ^{westward} ~~east~~ along slope $50 \pm$ yds. Leading one stopped at feces pile and defecated briefly (10 seconds), then group grazed on green mat. One scratched near sternum with hind foot, metatarsus horizontal - another same at elbow. About 10 scratches. Another scratched ribs - head + neck somewhat to that side as if for balance. 10:41, one down on side, gave one roll,

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ribbled forage, rose @ 10:50, one walked 50' from group as if it saw something to E. of me. It stood $2 \pm$ min., then lay prone, perhaps to watch. / Noted group of 4 or + 200 yds. to W. of me, grazing, & working up slope. There $\frac{1}{4}$ mile from 5 bunch. / Of 5, one ribbled ankle, anterior groin, ribs; then scratched proximal neck with hind foot. One 200 yds. behind me gave whistle. The 5 looked toward sound for 1-2 min. but seemed not alarmed. / Big group out of sight; perhaps group all ♂♂ or no young seen. / Another prone 11:08 and first prone one up 11:10. Large one walked along slope going E.; all followed & prone one rose. Leading one lay prone facing up canyon (away from direction move). It yawned, muzzle high, mouth wide open 1 second. The 4, grazing, 100' to east prone one at 11:15. 11:24, prone stood & made (it?) thin chi-chi-chi-chi facing me. Only one of grazers raised head & stared my way. 2 min. later supposed ♂ walked toward grazers. When came near my latter raised tail & ran several steps away. The 4 proceeded ahead of ♂ (?). Three in succession stopped at a feces pile. First defecated only. Second worked forefoot up & down and raised backward with one foot as if digging, then defecated & perhaps urinated. Third walked by pile 6' away. Another put nose to it but didn't work foot or defecate. Supposed ♂ walked forefoot up & down alternately 10 ± 1 ($\frac{1}{2}$ sec. per step), nose to pile, then turned & defecated & maintained stance $20 \pm$ seconds more (♂ urinating?). Then continued at walk down canyon after others. Three stopped in sight at top rock outcrop, 150 yds. from where former prone one was. Two lay prone 11:36; facing opposite directions, 50' apart, & third prone between them 11:38.

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11:40, the large group - 31 - was 200 yds. up slope from where last seen, at foot S. hill on green mat + adjacent short dry grass just below steep rock slopes. One had muzzle near feces pile, then raised head near vertical on vent neck in "wolf howl" position - yawn? One brushed head back + forth $3\pm$ x in 2' high Senecio bush.

11:47, 2 pushed necks thru same bush, then lay on side + rolled, mostly in bush. One turned over completely, rolling downhill, + rose. One lay prone + 1 min. later lay on side, head + neck on side on ground. Another lay on side next to same bush + gave three "back bends" into bush, throwing neck back + hind legs posteriorly. Then rose, shook body, + shook neck separately + after. Other prone also rose. Another lay prone (only 1 of 31).

11:55, 5 prone. Several noded on feces pile but none used it.

11:57, only 3 prone; group spread 45 yds. 11:58, one from W., tail up, ran toward group from 50+ yds. away. The whole bunch fled at moderate run. 1 of 5 groups, prone ones had moved down canyon by 12:00. 1. The one, tail up, a large ♂, headed group along for about 300 yds., occasionally ~~showing~~ ^{spacing} a few at side or rear but not within 10' of them. Only shown with tail out. Then, at 12:05, chaser turned about and ran to west, $\frac{1}{2}$ second per jump, for $\frac{1}{4}$ mile + before it went out of sight behind rocks. Ran along foot slope. Perhaps chaser a ♂ with harem chasing other ♂ or a band away; ^[doubtless] Group did not loitered where chaser stopped. 5 prone

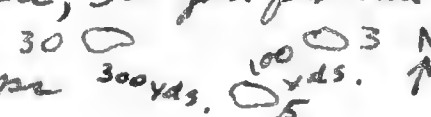
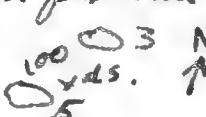
12:10. One defecated. I went to lunch + returned to watch 10 m. from point 200 yds. W. of house. Large group had moved 100± yds. down canyon along slope to where 5 were part of this morning.



Vicugna

July 5, 1951

Aricoma, 15000', Dpto. Puno, Peru.

At 1:05, 15 or + of the bunch was lying prone, all within 100' diam.
 1:07, only 1 of group standing, grazing; 2 or + on sides, heads + ^{necks} ~~heads~~ on ground. Sky $\frac{1}{10}$ cumulus; fair E. breeze. The familiar trio was grazing on S. side S. Ridge below Indian Market, 300 yds. from me.
 The 5 groups between + below other 2 groups ³⁰  300 yds. ¹⁰⁰  100 yds. ³ N
 The 5 on green flat, grazing. Warm out of wind. x me

1:16, of big group actually see only 22 of which 2 are grazing, others down.

1:18, ♂ of the 5 walked 50 yds. toward the 31, paused at fence pile + defecated (5 ± seconds), then galloped with occasional stops toward big group. When 30 ± ft. from group, they started rising. ♂ chased some individuals. Group (31 counted) walked up canyon in direction from which came. Chase tail arched - no others. ♂ often stood 50 ±' to side of group + watched them march by. One chased to 50 yds. ahead of group. After group moved 200 ± yds., ♂ stood one spot for 5 ± minutes (1:28+). Then again group lay - ^{or two} one occasionally lay prone. ♂ ran again at group + drove another 100 yds., about 300 yds. in all from starting point. Several of group lay down. At one time 6 rolling at once - some up + others down so probably 12 or more rolled. Rolled on short grass slope, neck thrown back ~~back~~ violently + hind legs posteriorly 3 ± x, belly downhill. 1:33, ♂ rolled too, 50 yds. behind group. It slid a foot down slope with each thrust. Then up. Rolled again. 1:34, ♂ galloped back now stop to where ³¹ ~~30~~ had been lying. Waited ~~say~~ few minutes. Then gallop 100 yds. stop. Then toward the 3 group. One (♂?) of 3 group came toward it, ^(1:36) tail arched. The 2 stopped 30' apart. Chase seemed not concerned and walked 50 yds. back to W., not pursued. The

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July 5, 1951

Aricoma, 15000', Depto. Puno, Peru.

4 ♀♀ grazed unconcernedly. 1:38, the 31 grazing on green mat where earlier today. 1:40, chaser grazed where stood, 50 yds. from the 4 ♀♀. Then walked again toward the 31 which had moved back 100 yds. 1:44, broke into gallop & went last 200 yds. to group. They fled together & chaser stopped; not within 50'. Chaser stayed less than 2 min., then galloped back toward his ♀♀. Stopped at feces pile - same as before I believe - and defecated briefly. Then galloped 100 yds., stopped 30± sec., another run, stopped 1:50, 50 yds. from ♀♀. Soon grazed. ♀♀ joined ♂. By 2 p.m. 2 were prone; 2:03, 3 prone. Closest of the 3 groups grazed 30' away but no animosity? Chaser of 5 tolerate 3 but not 31? & ♂ of 3 not intolerant of 5 on its usual feeding grounds? Of 3 group, ♀ + emim. 50 yds. from their ♂. By 2:06 the 31 had moved 150 yds. back toward 1 p.m. spot. One put neck & shoulder to ground, pushed 3± steps with hind feet before down on side, thrashed legs & neck. 2:15, ♂ of 5 grazing - not one of 3 prone. all of 5 within 50 yd. diameter. Grazing on green Distichis mat. 2:17, one prone, forefeet extended, rose on forefeet then straightened hind legs. One standing stamped one hind leg down behind, then rubbing other thus from thigh to heel with front angle of ankle. One ~~seen~~ prone raised muzzle high, mouth wide open, in yawn (2± sec. open). 2:20, of the 5 another up & one of grazers prone. Longest prone put extended forelegs under body, one at a time. The last to sit, prob. ♂, did not chew cud, forced me, ears back,

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July 5, 1951.

Aricoma, 15000'; Dpto. Puno, Per. J.

Perhaps one of the 5 got too near the 3 - working that way - for at 2:30
 prone over up & all 5 fled 50-100' as ♂ of 3, tail arched, chased
 one into the group. 2 of the 5 not being chased stood facing the
 action, tails arched, before turned & ran. Could these 2 groups be
 at a territorial boundary? If so, line must be sharply defined.
 2:30, the 31 approaching 1 p.m. site but still 75 yds. from it, gray-
 ing on green mat slope & adjacent, none down. 2:35, one of the
 5 ran to rest, tail arched, apparently chased by ♂ of the 3. This
 male made feint & apparent ♂ of 5, raised tail arched, made
 feint, the 2 about 10 yds. apart. Then ♂ of 3 walked 100'
 back toward ♀ & imm. The 3 grazed. | At 1 p.m. & still at 2:30,
 a lone one - the usual? - grazed 300 yds. N. of house on
 green flats near S. Ponds. | 2:45, ♂ of the 3 prone, 75 yds.
 from grazing 5. | 2:50, two pairs of 31 groups fighting
 mildly. Weave heads & necks about, one pushes other
 head with its muzzle, one puts its neck over other &
 forces it down as if to get forelegs over it. One such
 neck battle for 3± minutes, one aggressing. Then one away
 & other followed, putting head to heels of leader ^{so} as to
 trip it & occasionally putting muzzle to tail or
 side of belly. A thin drawn-out whistle from one of
 close group at caused several of 31 groups, 1/4 mile away,
 to raise heads & look this way. Of the 5, ♂ occasionally looks
 up canyon & at 3 p.m. walks slowly that way. ♂ stops at
 small feces pile & defecates - black ^{penis} ~~penis~~ tip & swellings of scrotum
 visible. Next 3 in file use same pile, first with nose to it
 & work forefeet up & down 8-10 times, somewhat faster at end. One

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Ancoriza, 15000', Dpto. Puno, Per. S.

squatted slightly more with hind legs after defecation & urinated. all latter 3 ♀♀. 3:08, one ♀ nosed feces pile, worked forefoot, spread hind legs, defecated - not much; ^{all 4 used same pile!} perhaps a repeat. ♂ fixes attention up canyon where some of 31 are within 100' of where he chased them from. 3:10, one of smaller ♀ defecates & urinates on same pile. ♂ of 5 wanders 100' toward 31 group and freezes. 3:10, ♂ of 3 prone as before, facing 5. 3:13, one of 5 defecates on same pile & another defecates a little 5' downhill; when first leaves, the lower moves to upper pile & defecates & urinates. Tail up about 10 seconds after starts to walk from pile. 3:15, ♂ of 3 stands & gives long whistle - sol-sol-sol-fa —, facing down canyon. Then 50' to pile & urinates (def. before?). 3:20, one of 5 rolls, then another 6' from it, bellies downhill, both on short grass girth slope. One rolls nearly onto back & gets up quickly & unsteadily making nearly others take a few quick steps away. By 3:23, all the 5 had rolled, some lying down 2 separate times. When thrash themselves nearly onto midback, legs wave about halter shelter as if hard to roll more or back down. ♂ rolled last, one side, then over (ventrally) onto other side. Gets up quickly with surge forward as hind legs straighten & then and up onto wrists, then uses forelegs straighten one at a time - this should be checked. 3:25, the 31 group spread about 100 yds., all in shade, upper ones near 1 p.m. site. 3:29, ♂ of 5 started up canyon toward 3 which were 200 yds. below the 31 (prob. not visible to him). Walked ^{100±} 200± yds., stopped at pile & defecated, then galloped on. Stopped 200 yds. short

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Aricoma, 15000', Dpto. Puno, Perú.

of the 3, looked uphill + saw closer (to his majada) 31, then galloped uphill toward them. Chased lower part of group; all moved away rather slowly. Upper half cut off by 50' of steep rough rock, about 30° slope. A few descended rocks but with ♂ below the last 12± reluctant to descend + gathered near edge. As soon as ♂ retired toward own band the upper group descended to rest of flock, now scattered about 200 yds., only moved about 100 yds. away. Lower 3, on green mat slope, not attacked. ♂ back 50 yds. from his ♀♀ at 3:40, the ♀♀ having moved about 100 yds. up canyon. / Occasionally 1 of 31 rolls in shade on brown grass slope, belly down. / Close 5 paid no apparent attention + cockling quess which flew low 100 yds. from them. (up 4:05±). 3:55, one ♀ of the 5 group prone; ♂ still 50 yds. up slope from harem. / The trio possibly crossed over S. Ridge - not discovered in S. Basin. The one 200 yds. N. House still there. Group 6 in draw 250 yds. S. house - where 40± one day - on green mat. The 31 scattered on steep brown grass slope above gentler green mat ^{slope} + below shale slide. / 4:05, one ♀ of the 5 group defecated. I turned to watch the 6, to ascertain sex if possible. No young in this group apparent - bristly sides, red brown. / Fog coming up canyon - 2 miles away. Getting cold. / The 6 worked slowly up draw, nibbling green Distichlis heads when appeared to be nothing taller. Save there up 4:15. / 4:17, ♂ of the 5 galloped up canyon again toward the 31. When it was 100±' away, about 10 of big group ran swiftly toward him and 2 passed him. He turned + chased leader; another following closely, tail arched, + once

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Aricoma, 15000; Dpto. Puno, Peru.

seemed to try to run in front & head him off. The 2 of group finally up onto rocky sidehill 200 yds. above ♀♀; ♂ stopped 50 yds. below, then back to big bunch - chasing? - then back to the 2 at a gallop & at 4:24 chased both, fast, to about ~~30~~ 300 yds. from ♀♀ and 1/2 mile from their own group. Then ♂ quickly returned to his band (4:25). Fog patches coming up canyon interfered with vision. Noted several fights in big band. At one time 4 pairs squabbling. Chase & put muzzle to side or back other. Wrestling & pushing with heads high. One climbed on back other (standing) from rear, on foreleg each side of lumbar region, head low & ears back; this "mounting" pose maintained 15± sec. These fights seen only in big bands - between ♂♂ presumably. Many saw such in band 39 near 5. Ponds one day. 4:30, fogged in so can't see animals. 5:30, fog ceased. I went to last watching spot. The 5 about 100 yds. further up canyon, still grazing. Of the big bunch 15± visible, at place where at 1 p.m. & later chased from by ♂, 4 or 5 of them prone (going to stay all night?).

July 6, 1951. At 6:13 a.m. at my last watching spot. The group of 5 came running 100 or + yds. down canyon to 100 yds. below where last seen. Soon started grazing (had been chased?). The big group about 100 yds. up canyon from where last seen. Uphill segment of 6 (3 prone) and others lower on hill, moving. One ran downhill ^{to} 200 yds. from group; stood; soon grazed (had chased bunch?) - later further down slope. Then group descended slope 100± yds. & grazed - only 25 counted (31 yesterday).

Vicugna

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Ariconia, 15000; Opta Pung, Per. J. :

6:20, one (the ♂ prob.) of 5 ran 100 yds. up canyon, defecated on a pile (same or near where 3 or 4 yesterday), then ran back to its group. At this time the one below big groups in plain sight of the 5. 6:33, I returned to House. Returned to watching 7:13. Groups about as before, the 5 75 yds. further up canyon (gentle slope in bottom), the big groups 100 yds. further down slope to S. 7:23, ♂ of 5 walked up canyon 100 yds, defecated on pile (+ urinated?), then up canyon in slow gallop to 30' from big groups. Nearby individuals retreated slowly. (One which earlier had tail arched or looked 200 yds. uphill at 2 others also retreated). ♂ stood a minute, then slow gallop back to 50 yds. from own ♀♀ (7:27). One of the ♀♀ prone now. Some of big groups came 50 yds. closer - ♂ again galloped up canyon, stopped to defecate on way, then on up to groups where drove them down slope, out of my sight. It was back with ♀♀ 7:36 (50 yds. up canyon from them). // The familiar trio of ♂, ♀, imm. was on S. slope S. ridge near flat of S. Ponds at 7:15 a.m. - not found 6:15-30. 7:40, ♂ prone 50' from nearest ♀, higher on slope. 7:45, ♂ which had been 200 yds. up slope from big groups had started up trail some feet higher and 200' higher, 7:30, walking; now about 100 yds. further up and 200' higher, crossing S. side of S. Hill - gave big band wide berth? // ♂ of 5 made another foray to big groups, returning to ♀♀ 7:53 at a walk. Paused momentarily at 2 feces piles but did nothing. 8 a.m., ^{another} the 5 of the 5 prone, all within 100' diameter. The trio about where before. Fair wind down canyon continued - very clear. The large groups had not reappeared so went in search of them. The trio walked 100 yds. up + across slope, to w. a lone ♂ paralleled

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Aricoma, 15000 ft., Dpto. Puno, Perú.

then 50 yds. uphill; stopped + defecated. another lone ♂ (the usual?).
 200 yds. N. of House (not at 6:30 or 7:15). || 8:22, found the bunch,
31 in number, at head of shallow draw next S. of previous
 canyon. at least half down but they detested me, 200 yds., +
 all rose + groups ran 50±' ^{they looked, ears back.} toward me; I remained quiet.
 Within 2 minutes 6 were down, in another minute 10 down.
 Two defecated - both ♂, one also urinated - stream may go
 posteriorly between legs. By 8:26, 11 down, 3 with necks + heads
 down on ground. ~~one~~ ^{one} spot probably somewhat protected
 from wind. 8:27, 12 down - only 1 not facing across slope
 in same direction (± into wind). When down flat on side the
 forelegs  or  and hind flared . 8:31, 13 down, 6
 with neck on side. Another with neck forward, chin on
 ground . Another lay on side but neck up.
 One had side neck on slanting rock, neck tending upward
 distally. Some went atop ridge as if looking about. Some rose.
 8:33, only 9 down - 8:35, only 2 down, apparently young. These
 rear of groups on ridge now. Up one at a time, last 8:37. All
 walked slowly over ridge going W. I found them grazing
 on gentle slope of mt 200 yds. to W. of lying site at
 8:47. || Noted trio had ascended ~~stope~~ ^{slope} to where seen yester-
 day afternoon - below Indian Markers - 8:40. || By 9 a.m.
 the big group another 100 yds. WSW. One put nose to feces pile
 several times, then raised head with muzzle high, mouth closed (seen
 once earlier today; smell stimulates?). Another nosed pile + defecated
 some with tail up but hind legs not spread - as if stimulated.
 One worked best on pile but did nothing. A group of 5 grazed on

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Aricama, 15000', Dpto. Puno, Peru.

green wet mat 300 yds. to W. At 9:15, one of this group, tail arched, came to big group and drove them back 100 yds. to E. Stood 10±' from them, then chased into groups, often containing after 1 for a turn or 2, head at belly level. One ducked back with hind feet (or foot) when chased 5' behind. A bunch of 2-3 first driven 100 yds., then chased back to W. + some heard alarm calls. Within 2 minutes the other 8 came to E. around other side of rocky knoll, the chaser standing on sideline. When all joined into one group, chaser galloped back to W. Its ♀♀ (prob.) had moved 200 yds. away from action. The 31 grazed on green mat + at 9:30 were 100 yds. up slope at foot S. Hill where were about noon yesterday. Fight: one pursued other, putting neck over back, once knocking it down onto knees; recipient laid ears back + made feint toward other at end battle. 9:34, 5 prone or on side of the 31. 9:35, 7 down, 2 with necks down or lay on side. I caused slight alarm by moving 3'; those down rose; many looked and walked a few steps toward me; one gave ^{reality} metallic crunching chuck-chuck (monotone vol). One defecate, turn about, nose pile, turn about, defecate again. 9:45, all but 5 in (, abreast, moving up canyon on hillside, most 2-5' apart. This "formation" lasted only 4± minutes. Brown within 50 yd. down. ♂ defecated, then hind feet legs remained apart as moved pile 10± in. Another squatted 5' away - following instinct for defecation, rolling, + following in walking, evidently strong in winter. 9:55, one defecate on pile. Within 5 minutes 4 others do same on same pile. at least 3 ♂, others not determined. Two defecate at once, 5' apart, opposite side pile. Defec. proper takes about 5 seconds.

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Ancoma, 15000'; Depto. Puno, Peru.

grass coming in first-sized clumps mostly, but stands with tail
 up usually held about 30 seconds in all. Ears forelegs parallel
 and about 10" apart, hind spread twice as much . One
 held tail horizontal as passed pile but did not stop - stimulation
 of right or smell? 5 down 10:03. One rose to pile, then head almost
 vertical, muzzle up, on bent neck, ears back , this re-
 peated in lesser degree 3-4x - smell stimulation? Fast gait may be
 a true gallop - forefoot hit one shortly after other; same with hind;
 perhaps both with same leading foot. 10:07, 6 prone + 3 on side
 with neck + heads on ground. Wind continues fair from W., down
 canyon. Most ^{prone} face down canyon, lying across slope. One on side
 with belly uphill, neck bent dorsally + extended down slope. On side,
 legs either straight or flexed - one fr.  hind. 10:15, 16 down of
 which 6 flat on side. One prone has neck , bent up at rt.
 angle. Usually . Occasionally one lying rubs neck or head
 back + forth on grass - scratching. One chews cud while lying on
 side, neck on ground. Those on side, head + neck up, may have fore-
 legs under chest as when prone, strongly flexed, or extended ventrally -
 all intermediate stages. 10:22, 18 down. An assuming prone
 position, heels are high when forelegs folded at elbow, then heels
 go down. 10:27, 16 down of the 31; others grazing; all within
 50 yd. diameter. 10:33, only 13 down. Some mild alarm down
 canyon - all but 4 rose + only 1 down a min. later. ~~to~~ Insects
 looked down canyon, then grazed. 2 more prone by 10:35. 8 down
 :37. One defecated + urinated, apparent 57; defecation < 10 sec. but
 legs spread + tail up 50 sec. in all. Then rose to pile and
 up high + vertically 2 or 3x. Another which defec. 6' away also

Vicugna

July 6, 1931

Aricoma, 15000', Depto. Puno, Peru.

put nose high & vertically for a second after nose to side - "wolf
 howl" position. Do ♀♀ do this? 10:41, 11 down. One grazes or lies
 prone. 10:45, one defec. + urinate; prob. ♂. 14 down, 2 on side. 10
^{prone} face down canyon to E. - ± toward sun. Prone ones lie on contour
 of slope, bodies ± horizontal. One lies with outstretched neck // to ground
 surface but chin on ground. 10:52, 15 down. One defec. same pile as
 last one. Group within 50 yd. diameter. About $\frac{1}{3}$ of prone ones have
 one or both forelegs extended anteriorly. Occasionally one shakes head side
 to side, ears flopping loosely or one lying on side gives a single rolling
 thrash dorsally. 11:01, all of the 15 down are on the steeper steeper slope
 above gentle damper green mat but most grazers on lower slope.
 Probably do not like to lie on damper ground. One walked 50' to fresh
 pile. Tail up as approached. ^{Fr} 10 sec. ~~face~~ ^{face} dropped as sniffed pile,
 hardly in stance. Then to 6' distant pile, took stance, defecated (+
 urine?) holding pose 2.5 sec. Tail up 45°. Fore + hind feet close
 together in side view . 2 min. later another defec. +
 urinate same pile. Some defec. after urination. Neck in
 moderate curve  during process. 10:10, 11 down.
 10:15, another defec., same pile. Noses pile, turns facing up-
 hill, raises tail, spreads hind legs, defec. 5 sec., long pause
 (prob. urinate), defec. 2 ± sec., walks off, nose adjacent pile.
 By 11:20 4 were defecated on same or 6' distant pile. Time in
 stance 40 sec., 45 sec., 20 sec., 20 sec. Defec. usually started
 at a slightly before got in stance with legs spread; lasted 5
 to 10 seconds. One worked feet up & down (8 ± steps), then
 turned 90° to ~~stance~~ take stance. Penis of one seen. Others
 showed no evidence femininity or large posterior urine stream.

Vicugna

July 6, 1951

Aricoma, 15000', Depto. Puno, Peru.

During process head (base) at level top back, ears horizontal, head moved about little, at least, moved pile by 11:25, another defec. + urinated same pile 11:27. 11:30, one moved the 2 piles + 2 or 3 near - misses, tail up out, but did nothing. By 11:33 2 more defec. at pile group. One in stance moved pile + lifted head quickly, shaking it, & raised muzzle high, head vertical. Repeated. Anomalia in nestles? 10. 11:35, 13 down of which 6 on side with necks on ground. 1, prone, raised head, reached back with head, + nibbled metatarsal 10th. 11:42, 15 down. Shaking head or waving tail frequent; occasional flick today. Breeze down canyon continues. One at dusty spot on slope; pawed ground one forefoot; down on wrists, one at time, then neck to ground, then down on side. It thrashed 3x on one side in dust, then stood. Shook body. Another approached + the two had brief fight. One put head over other's shoulder. One got neck over other's & not bent forelegs as if to pull down or prevent being being pulled up. They bumped chests hard. Then walked ~~one~~ along 10' apart. One moved face pile + threw nose high twice, then defecated. Group has drifted about 100 yds. down canyon (to E.); only 8 down at 11:50, 4 at 11:54. 5 all down ones at rear of group. Face pile now at rear, earlier in front. In last 24 hours maximum range this big group $\frac{1}{4} \times \frac{1}{4}$ mile or $\frac{1}{16}$ sq. mile. Next to last up 11:58 + last a minute later. I went to lunch. 1 p.m. saw the 5 groups 100 yds. NNW of stone shelter from which I observed yesterday, all prone. The 31, at 1:15, were 100 yds. down slope to S. of noon site. Some alarm when I took position 200 yds. S.E. of them but back to grazing in 3+ minutes. About 5 defecated one after other at one pile (came 6' from it),

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Ariconia, 15000; Dpto. Puno, Peru.

this pile 100 yds. from previously used one. One penis one seen. at least 3 urinated, fine stream, passing posterior to anthers. 3 down (1 on side) at 1:30. Two had brief fight. One grasped back others neck a few times with wide open mouth. Some neck wrangling. One fell over as if legs knocked out by others neck or head. One put nose to anterior proximal thigh of other, running away; latter kicked back with hind foot. 1:40, 8 prone, in spite of mild alarm caused by my movements. alarm drum call - la-la-la-la-sol in screechy sound; many looked toward me & leading several walked back into main group. Noted this tendency to bunch in alarm before. By 1:45, 14 down. Occasionally one waggles one ear only or to shake off fly. Getting up intervals leave forward as hind legs straighten & forelegs up onto wrists, then ? - take step or raise both at once or ? One mumbled at inguinal region, hind leg up & out. 1:54, all up, all give a start, lurch up, & run a few steps, then walk, moving 75 yds. up canyon & uphill (a ♂ of band approach?). At 2 p.m. a ♂ doubtless of 5 down canyon - approached 100 yds. below band. It stood several seconds, then in easy gallop, tail down, approached group. At 30± group raised heads from grazing & began to move away. Lone male charged one 50' up slope and made 3 or 4 other charges into group, occasionally tail arched, touching none. The bunch was herded 100 yds. across & up slope. 2:04, the ♂ back down canyon at slow gallop. 2:07, 13 prone on slope, all but 1 facing down canyon. 1 or 2 rolled. 2 had brief fight, one with throat over others neck as if bearing down. One kicked out sideways with one hind foot toward others head. 2:10, another rolled briefly on dusty spot; another 2:11.



Vicugna

July 6, 1951.

Aricoma, 15000'; Dpto. Puno, Peru.

One defec. on pile 50' uphill from group. 2:12, 23 prone on one side, then 25. Another rolled in dust on slope, then rose. Another brief fight, one putting head under belly of other. 2:25, one to face with same as used this morning - defec. + urinated, then walk back to group. Now 23 down. Wind intermittent, still down canyon. 2:30, in last 2 min. all but 12 rose, 1 at a time. Hind legs raised fully, then one foreleg takes step up from sciss, then the other foreleg - this seen 3X. Only 7 still down 2:34, others grazing on green mat + working up canyon. 2 more up by 2:35, other 5, 1 at a time, by 2:36, + all walked to group. By 2:40, 6 had defecated at one pile (not seen used earlier); first leading one, but bunch 50' ahead of last finishing. Once 2 defec. at once, 6' apart. Some urinated too. By 2:42 group concentrated 250 yds. further WSW along base S. Hill from lying spot where rock slides + yellow flowered Senecio joins brown grass. Have seen none take water here last day but may be some in holes ^{in green} ~~between~~ mat. ^{gr.} ~~gr.~~ \pm feed among rocks + talus, the rest on dry short brown grass area below. One nodd feces, raised nose high, waked forefeet up + down, defecated. Eventually 10 \pm among the rocks + Senecio + bunch grass + seeming to find enough to eat as 8 latened there while others on 50 yds. below foot rocks. 3 p.m.; faint series began. 3:15, group 200 yds. further W. along foot S. Hill, none down. One brief head-pushing fight. 4 rolled briefly on steep slope in dust. Tail goes up dorsally as neck thrown dorsally in thrashing. Usually 3 thrasher in succession, sometimes repeated. Group in line about 50 yds. long, almost, heading E. again 3:20. all gave a start + ran 10 \pm 'ahead (why?). The main westward extends range since yesterday noon about 200 yds. to W,

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July 6, 1951.

Aricoma, 15000', Dpto. Puno, Perú.

This group now all in shade - no sun - seeking by vicuñas. No apparent leader in band. Several rolled briefly. Several x one run to brush neck or head back + forth on short tala to scratch. One attacked another, putting head over rump + pushing. Repeated 2 or 3 x. Then recipient attacked aggressor but fended off by kicking backward with hind feet simultaneously. 3:40, group working slowly up canyon (to W.) along foot slope. 3:45, one fight between 2 for 10 minutes. One held dorsal neck of other in mouth several times. One tried to put head under chest other + tripping front legs. The defense often by going down on knees + leaving no room under. Back legs also tripped with head. Backward or sidewise kick of hind foot is most vicious blow. Several times one reared up on hind legs and rammed other with chest + flexed forelegs. Mostly pushing each others head + neck striving for advantage. One finally down prone while other tried to pry under tail + side body with muzzle without success. This ended fight the prone one rose up. By 4 p.m. group below foot of rocks working E. again in crude line abreast. Fair wind from E. - reversed direction. 4:03, one defecate. One defec. 4:10, 2 more, same place, by 4:13. One out more to pile, then high + vertical, twice, then defec. (30 sec. in stance), then to pile 5' away & made 5 sec. effort. One, ears back, head horizontal, spit at neighbor 3' away; no retaliation. Lying down after 4 p.m. apparently rare (unless for night), most energy late in day going for feeding. By 4:30 3 more had defec. 1 pile (at least 1 urinate). By 4:35 (sunset my site) 2 more defec., both on pile 100' downhill from other. What is advantage of making piles? I went to

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Rock shelter near camp & saw the 5 within 100 yds. of it. Went to House, E. at 5:35 up canyon & saw group of 31 on slope of S. Hill at base, 200 yds. W. E. last site. New moon. Calm evening.

July 7, 1951. Clear morning. 6:45, saw 5 (the close 5?) on crest of S. Ridge 1/4 mile N. of the rock shelter (200 yds. NW House). Another 200 yds. further up (to W.) this ridge. The big bunch at 7:50 was at base S. Hill, where much of yesterday, & was having an encounter with other vicuña. Much vigorous shoring (at least 2 simultaneously). & A continuous high wailing scream was heard for 5 minutes. Occasionally a hoarse cat-like growl, apparently from fighters. One fight, contestants reared up on hind legs and came together with forelegs & chests. Another was head wrestling, both finally down on wrists. 7:00, fighting subsided and 3 walked slowly westward along ascending path partway up slope of S. Hill. || The single on S. Ridge came up canyon at gallop. Stopped on high point 3± minutes & another 5± minutes. Did not get closer than 200 yds. to big band. 7:09, it galloped back down canyon and stopped on slope after 200± yds. / at 7 a.m., three were ascending slope near the rock shelter. At 7:15, 3 others came over S. Ridge near Indian Markers. The lone one chased the 3, which (this is usual trio here). fled across & down hill 200 yds. The lone one then ~~came down S. Ridge~~ ^{on down S. Ridge} to where group of 5 were and stopped 100' from them. ~~other 3, first trio stopping & grazing (the usual trio here).~~ The presumed ♂ of the trio chased the 3 ascending hill & these fled fast until about 1/4 mile ahead of ♂. ♂ then returned ^{to} ~~found~~ its other 2. The lone ♂ (near the 5) took no share of the 3 and pursued them on over S. Ridge. ~~At~~ || 7:23, the usual trio on usual slopes near rock shelter, 5 were on

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S. ridge 100 yds. E. of them, ^{why is the lone ♂} ~~lone ♂ (returned)~~ so aggressive?

7:28, lone one was

~~7:28, lone ♂ returned~~ 150 yds. downhill to S. of big group. There was a cry from ♂(?) of trio - probably at move from lone. Lone one did not see me; it started walking down canyon toward trio. Trio walked away 100 yds. (perhaps away from me, 200 yds. away). Then trio turned

back & walked 50 yds. up canyon. The lone one grazed 100 yds.

7:40 later within 30' of them; no reaction.

from trio & // Saw 5 prone on S. ridge where before, + a lone one - prob. returning lone ♂ - prone 200 yds. E. of them also on crest of ridge. // Cool fair breeze down canyon. // Of 30 groups - only 30 counted today - 7 prone at 7:37. Two separate. One raised pile & made "wolf howl" position, twice; teeth showed white at mouth when muzzle highest. 7:55, 20 of group prone; but at 8:04 scattered 200 yds., none prone, some to furthest E. (down canyon) observed for this group. Withdrawal of those furthest E. so at 8:15 all on green wet slope where have often been. 8:30, 2 prone. Two are separate from the 30, 200 yds. further down canyon + perhaps not ^{part} of the band. The trio over break in slope & about 400 yds. E. of them 2. // Some actions this morning seem to show there is a "red order" between groups, or between ♂♂ whether in group or not. // One rolled in grass - turned completely over & rose quickly. Rolling ^{all the way} over sometimes used as means of getting up - usually rolling down slope - but not as means of scratching. // 8:42, 6 of 30 prone. Group spread 75 yds. One grazed while prone. One raised muzzle and opened mouth 1 second in yawn. Another prone gave quick yawn, muzzle high ~~low~~ - a minute later gave one yawn again, muzzle nearly vertical, lower incisors easily visible. Yawn is quick; about 1 second. 8:51, 9 down, 2 lying on side (1 neck up). One

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prone has neck extended anteriorly, jaw on ground but not neck, ears back, eyes half closed. 9 a.m., 15 down. One vicuña warbling, descending warning whistle; several look way way but none rise - mild alarm. I am half exposed, 300 yds. toward run from groups. // The 2 down canyon apparently not of big group - hidden from me by ridge. // 9-9:05, 3 defecated same side, first going 100' ^{up slope from} ~~above~~ other of groups to pile. at least 2 urinated; stream in fine. One more to pile (do not actually touch feces), then head up + step up + down forefoot 8 beats (about 1/2 sec. per step), then turn so slightly, take step forward, spread rear legs + raise tail horizontal; 5 bladder experiment, then ~~urinate~~ ^{urinate} walk away without further atten. to pile. 9:10, 21 of groups down, 11 flat on side with neck + head also on ground, 1 on side but head up. 2 defec. on pile 50' from other. at least 1 urinate too. Head forward, ears horizontal, hd. slightly above level back, as urinate. 9:22, 2 defec. + urinate simultaneously on piles 10' apart (same as last 2). One drops a few feces after urination. Perhaps slight additional crouch ^{at} after start urination (more in ♀♀?). 9:25, only 5 of 30 up. One drops feces 6' from pile as moves near pile, hind legs not spread, then shakes head side to side, ^{then} lifts head vertically on curved neck in "wolf howl" position. 9:28, only 3 up. Group spread 50 yds. on dry short brown grass slope. 9:30, only 2 up, these grazing. Of 28 down, 7 on sides with neck + head on ground, 2 prone have only jaw on ground (neck stretched above ground). One on side, rising to prone, raises neck + head, tucks folded wrists under chest, then up onto folded hind feet. Orientation ~~now~~ on contour of slope for most part but about equal number face breeze + down canyon. By 9:50, 11 up. ~~See also~~ Three defec. in



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3 \pm minutes. One defec. at 6' from pile - do not all use same pile or spot their droppings accurately. One defec. one pile, move 6' to another, defec. + urinate. Only 2 down 10 a.m., others having risen 1 or 2 at a time. 3 \pm defecate + urinate. One rose to fresh evacuation, then headed  in "wag-hood" sort, neck bent at rt. \angle . Then 6' to higher pile, ~~if pauser~~ 10 \pm ' in stance before 3 pellets dropped, then walks away slowly. // I went down slope to look for other groups. The trio on frequented green slope 200 yds. NNE of rock shelter. The 5 about 50 yds. NW of House. As I approached them a lone 07 (100 yds. N. House) saw me + gave warning whistle, I 300 yds. away. The 5 between me + single one; they ran 100' across slope at warning, then stopped + looked at the lone one - not at all toward me, behind them. Apparently no directional warning altho whistle faced me squarely. Group of 5 went around hill + at 10:35 ^{was} ~~was~~ grazing 50' from the ^{the} trio near rock shelter. (5 more + 1 other 10:50). AT 10:40 the 30 had moved 300 yds. up canyon (to WSW) from where most had lain down; grazing on green slopes. Water + ice in some pockets - presumably they got water if desired. By 11 a.m. 30 grazing same spot on gentle slope of green mat. Breeze light. $\frac{2}{10}$ cumulus clouds; thin cirrus haze above. Breeze intermittent & now from E.; the 30 are 300 yds. downwind from me (11:05). By 11:40 group had worked 75 yds. back to eastward. One lay prone. 2 rolled on side briefly. Clouds increasing - $\frac{4}{10}$. 11:40, 3 down, but 2 quickly rose + started to graze. Three down by 11:53. Two fought for 20 \pm sec. One put neck over base others neck and held forefeet up and tangled them in others forelegs or else pushed forward with chest trying to knock other over. Some just pushing necks together on

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if to throw other sideways. Some spitting seen. Both stood stiffly, ears back, as fight ended. 13 down at 11:58. The bunch 100 yds. N. of where first seen July 5 at about 11 a.m. Since then range well within 400 x 600 yd. area. 14 down 12 M. I departed. At 1 p.m. went to rock shelter; group 5 150 yds. to N. Then at 1:15 to the 30 group, now 100 yds. further ENE than an hour ago; 1 prime, others grazing. 7/10 overcast + light snow falling. Heard a "caw," - went 4 - and saw group 5 being chased up slope by a lone one (200 yds. W. of rock shelter). Aggressor stood 15' from group 3 \pm minutes, then away, chased by one of group. It turned + chased its chaser a few yards. Both had tails up. Then the one back to group of 5. // Some fighting in the 30. One, prime; another had chest against it pushing. Some biting of opponents' heels with open mouth. Pushing of head + necks. At least 2 pairs fighting at once. No sounds heard 200 yds. away. One, fleeing, had ears down so invisible from front. Occasionally looked back at pursuer with one foot. Pursuer weakly attacked by another. Fleeing one came close to grazing group - perhaps hit them - & was briefly chased by 2. 1:45, 2 defec. same pile in turn. Testicular bulge not apparent. Both moved adjacent pile afterward & let a few pellets fall from anus (tho not in defec. position). By 1:50, 2 more defec. One give "wolf howl" before, walk 3 \pm steps, defec. but not urinate. By 1:55, 2 more d. & u. same spot. Urine stream passes posteriorly ^{behind angle} at bent knees, drops just posterior to ankles. // Urine stream pulsates; one 12x in 5 sec. Tail sometimes shows slight up & down movement - about 3/sec. - while ascending. 2 p.m., all grazing, moving down canyon to E. again. Whatever

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eaten seems to be less than an inch in height. 1:05, group looked down canyon, slowly reversed direction movement. Passed over the used fecal pile. 6+ defec. +/- urinated. One urinated 10 sec. One near pile spit at other; then both ran a few steps + stood, ears back, muzzle high, neck straight. Two moved piles + gave "wolf howl." One put head back so lower jaw past vertical, neck strongly flexed dorsally. Put head up twice after one nosing. Lower incisor bared when muzzle up but mouth not wide open (lips pulled back?). 2:37, several of groups stood looking down canyon, ears up . A few ran away a few steps. Then whole group ran 50 yds. up canyon, then walked up slope toward rocks 150 yds. in file, then ascended gently along slope to crest of S. Ridge below lowest Indian Marker (2:47 reached). In transit 1 or 2 stopped to defecate. Occasionally some grazed. Pace often slow - 1.2 sec. per step off front feet. Bunch strung out 200 yds. Leading 3 separated more than rest. Move to ridge about 500 yds. airline from start. I went down to rock shelter. Saw the 5 descending slope toward S. Ponds. 2 were on S. Ridge to N. of rock shelter - these ran down ridge to E. Then I saw cause of movement - an Indian carrying large sack came down the canyon, ^{apparently gathering dung.} ~~carrying large~~ The 30 loitered atop S. Ridge to 2:50, then on over to N. Wind up canyon persisted. 5 remained near rock shelter in spite of the man. I saw 3 (the trio?) flee across path of man, down N. side S. Ridge, + to hill E. of S. Ponds. After man passed, these grazed on flat at N. end of S. Ponds. I took circuitous route over S. Ridge to look for the 30. The lurch was

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200 yds. along contour to W. of where crossed ridge, on a
 grass slope, 200 yds. downhill to E. was group 5 with
 1 ♂ separate. 3:38, this ♂ ran to 50 yds. from bunch + stood.
 Another ♂ from W. attacked group from other side and drove
 bunch eastward. First ♂ then joined in pursuing individ-
 uals or groups. No actual contact. Second ♂ ran off to W.
 It stopped to eye another individual 200 yds. up steep rock
 slope of S. Hill, then continued on (part of group of 4 at
 base S. Hill). The first ♂ again chased some of bunch.
 3:44, attacker had withdrawn 50 yds. downhill from
 bunch - which had moved up steep slope - and its ^{5 + young} ♀♀ were
 [M 4 ♀♀ 1 ♂] 200 yds. further down. The 30 ran among rocks, took
 bunch grass; not much food. // 3:42, ^{one high} the one highest
 on S. Hill galloped 200 yds., ascending even more, to where
 5 were ascending rocks. It stood 50' below them, then
 ascended (it the ♂ of this group probably ^[♂ 5 ♀♀, possibly probably five due earlier alarm]) and was follow-
 ed (3:45) by another. Little vegetation; rough rock +
 rock slabs, but vicuñas adept on rocks. The last 2
 walked up onto small flat + the 5 soon joined them there.
 // 3:49, one (♂ of 6) still chasing 30 occasionally. They moved
 away (to W.) from S. ridge crest, scattered 100 yds. across
 rock slabs; seemed to find some forage. The 30 started to
 file up toward the 7. One of the 7 descended rocks 50'
 toward the leaders of 30, then back up. One still chasing
 among rear bunch of 30 though the ♂ of 6 was 100 yds.
 downhill, standing, toward its ~~East~~ harem. 4:00, this
 low one descended to its group. The 30 now split

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into 2 bunches, lower group just above highest Indian Market and upper (of 11) 50 yds. up crest S. Ridge. 100' higher level one of the 7 was at edge of cliff looking down. The lower part of 30 drifted off across slope going to S. side of ridge, while 2 of upper group started off on N. side + rest loitered on crest. Apparently lack leadership in this big group! The 7 descended rocks toward leader of approaching group (4:15). One descended first, tail out, + chased leaders of the 4 back, 1 at a time, about 100' toward crest ridge. The other 6 of group quickly descended behind their guardian and went westward down descending trail. 4:18, the guard ran after the 6, stopped 100 yds. behind them, looked back, + at 4:20 again ran after the 6 (prob. ♀♀). all ran at times. // 4:20, the upper group 11 all that is left of the 30, others having gone over to S. side ridge. 4:22, the 11 started down same path followed by the 7, also occasionally running. In file. The 7 cut downhill last 100 yds. to quarry (4:25). Of the 11, occasional mild head pushing or tripping between 2. One stopped at face pile, noded it, worked feet up + down, then ran after the rest of group, now 50 yds. ahead. 2 had brief fight; 1 lay prone in defense; third ran down slope and into prone one with chest. Pursued one leaped back with a hind foot. The 11 pauses 3[±] minutes were the 7 had descended, then continued along slope contour. at foot of slope there were 4 (of the 7 group?), and one, tail up, 50 yds. up slope toward the 11 (100 yds. from them). Its tail vertical on run. It ascended a few steps and

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5 of the 11 ran toward it, stopping 10' away (4:30 - brown in late afternoon?). 4:34, the lone one stalked toward the 5 + they walked a few steps away (rest of 11 still 100 yds. up slope). The lone one driven slowly 100' uphill; upper part came down + joined them. 4:39, 11 grazed and descended slope slowly. One ran at another and was met by blast of spit (visible as fog). 4:42, one stood stiffly ^[post. or of usual 5 here] on rock prominence while the 11 grazed (the one from 7 groups?). One rolled on slope. Two more rolled. One mild fight between 2. 4:45, the lone stiff one ran down to lowest of groups; it + adjacent ones retreated, walking, to eastward. The lone one twice walk through 2' high brush + grass as if to scratch belly. 2 of the 11 fight on dusty slope. The lone one rolled; again crawled through tola + grass clump. By 4:49, also several of the 11 further down slope than the lone one. Then all 12 grazed on the slope only 100 yds. from 4 at foot of slope (of the 7?). The 12th grazed as one of the group - indistinguishable (5 p.m.). There was a group of 4 about 200 yds. to E. of the 12. The presumed ♂ of this had earlier chased the 30. No reaction when the 7 or 11 passed along trail 400± yds. uphill. Group 6 about 100 yds. S. of Island Lake (♂ earlier chased the 30). About 5 p.m. saw 1 of these chase another, tail up, for 20±'. Then one the young one of this group nursed for about 2 minutes. ♀ stood still and erect. Young faced right side and bent neck up 90°, head vertical under ♀. Only young of this group. I went

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back toward House. 5:15, the two at foot usual slope; at 150 yds. one whistled at me; then hoarse call. They were 200 yds. from N. and S. Ponds ^{to} where chased earlier. Question is: will split groups 30 males rejoin? (Ho - see July 8)

July 8, 1951. 6:10 a.m., calm, 2°C . The familiar trio 200 yds. N. of rock shelter (200 yds. from where seen last evening). One called, strongly whistly ^{söl söl lä söl} ~~chü~~-chü-chü-chü. Another (?), much hoarser, called ^{söl -} ~~chü~~-chü-chü-chü-chü ~ fa. Sex difference in calls? 6:15, saw the 19 (of former 30 ♂♂) 150 yds. down slope to S. of highest Indian marker. Apparently traveled little after crossing ridge last evening. One defec. Is grazed near rock outcroppings on slope. Two prone - these rose 6:24. One ate 8" stalk dry grass - stalk stuck out 6" & was chewed down in a few chews. Strutin slowed to E. & low obscured sun until 6:30. 6:32, ♂ from 5 down canyon (200 yds.) to group, chased 1, chased group. All started westward along slope at walk. 6:34½, ♂ back down to its group (this ♂ bigger than most of 19 it appeared; big bands ♂♂ probably mostly young - about 5 of the 30 seemed adult). Group chased about 75 yds. up canyon & by 6:37 had moved on another 75 yds. 4± defec. on 2 piles 10' apart; 2 or + urinate too. 6:41, another d. & ur., walk off within 5 sec. after finish urination. 2 prone on grass. 1 chase another briefly as to wrestle necks. At same site where group has often been before in last 2½ days (below Mary's live trap). Two prone chew sand, 2 others graze, 200 yds. from 6:15 posit. Perhaps do not feed at site. Close to p.m. position in a.m. Feed vigorously in late afternoon. Two parts split group did not join at night. 6:52, prone 2 up & graze. One walk at pace ½ sec.

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per step of feet. 7 a.m., all goats at edge green mat on gentle slope, 50' from bare rock outcrops. 5 others 200 yds. down canyon & the two 300 yds. further down. // I away until 7:45. Then the 14 were 200 yds. S. of last position & on the move. 7:57, another 300 yds. S. toward S. Pasture. One 1/4 mile ahead of them on ridge ~~also~~ whistled sal, fi, fa. In direction from which group moved, a single one defecating (♂ of nearly 5?). Another single at foot of rock slide 400 yds. to W. Group in imperfect file, walking over rocks easily. The Leaders crossed a 50' wide x 10' high rock ridge which could easily have walked around on grass. 7 lost 200 yds. behind leaders (8:03) but all after by 8:10. No wind, 1/100 altitudes to E. 8:23, all 14 at ^E center of S. Pasture, 500 yds. ENE of Center Knoll. Total move about 1000 yds. this morning. One nose pile; then "wolf howl." Another at another pile, twice; head shake, then up so that jaw line posterior of ~~vertical~~ vertical . Several defecate. Goats. Now fair wind up canyon. 8:26, one moved 200 yds. more, to E. (down canyon). 6 grazed 200 yds. behind (^{down} stream bed), others between. Leader defecated, grazed. 2 prone 8:34, 3 8:38, 5 at 8:45 (including leader). 8:48, some up (3 down yet), all within 100 yds., grazing. Downhill one up & walked down gentle slope to E. followed slowly by 3 others. 15 continued to graze where they were; some 9:05 (2 down). Four wandered 50 yds. further up canyon. This group has ranged in rectangle estimated 1200 x 600 yds. in 3 days - actually less area or range shaped . 9:10, 2 of lower part group are 100 yds. downhill from next highest, grazing. Another group 3 400 yds.

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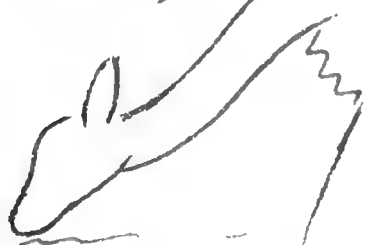
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west of the 15, 2 near Center Knoll, 1 600 yds. NW. of 15. Many feces piles in S. Pasture but no more than faint greenery (no Distichlis mat). However, flowing clear icy stream on N. side (Ice Creek). 9:20, 1 prone (of 19; different 1); Loner 4 had again moved downhill from group. The 15 bunched toward uphill members 9:25. // Loner one, 300 yds. from group 3, moved 50 yds. toward them. One of 3 came 100 yds. to meet it. ~~Both~~ Loner one moved ^{toward} ~~mass~~ ^{to group} but closing. The 2 stood 50 yds. apart 3 \pm minutes, then Loner one on to W. & other ~~looked~~ ^{slowly} ~~stayed~~ to its other 2.

[1 - 1 at site of the 4 at 9:45]

9:35, 4, apparently separated Loner 4 of 19, came up slope at grazing




slow gallop, passed 300 yds. from the 15, passed 100 yds. from the 3. One of 3, tail out, ran 50 yds. toward them & stopped, but they continued on, galloping, &

were not attacked. The 4 overtook the Loner one & all 5 ran together in file without apparent animosity. One, rear, paused a minute to look at one atop a ridge (Center Knoll) 300 yds. away, then followed group. // One atop Center Knoll attracted attention of the 3. One ran toward knoll & others followed. One off top knoll when approached to 50 yds. & the 3 over the knoll. The 3 had passed 100' from one of 2 on SE side knoll; slowed down but no ~~see~~ fight. This left only these 2 and the 15 (all but 1 up & grazing) visible in E. part of S. Pasture (9:45). 9:50, 1 (of the separated 4?) was 300 yds. downhill to E. of the 15. It looked toward 2, at higher level 200 yds S. of it; after 5 \pm min. it lay prone facing the 2 (common action? - sit facing possible danger? to watch). 9:54, 6 of the 15 prone - face across slope or downhill. 9:56, 6 (large, red)

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came up the creek near me. One chased another in 50' diam. circle. Only chaser tail up. Top head level with or below level back. ^{another chase; or 2 separate; for 100 ± yds.} Then the 6 went toward the 15 - the whole group ran 100 yds. toward it. One ⁽¹⁶⁾ tail straight up, ran to group & stood stiffly on rock as they milled about it. 3 of the 6 stayed away from group & walked around it, 100 yds. away. These joined by a fourth. Two from big group walked away to S. These chased by 1 of ^{another} group of 4 which was E. of Center Knoll. This same one chased the 4 (0707) over Center Knoll (150 yds. from rest of its band). Group passed 50' from 2 others on Center Knoll (there an hour or +); one raised tail & stood stiffly. The separated 2 continued on to S. 1/4 mile + from ^{big} group (10:03). Still 15 in central group, + one 100 yds. from them. 10:08, group walked uphill to SW. The lone one joined as 16. 2 or + defecated. Now 200 yds. E. of top of Center Knoll. 10:14, 1, then 3, tails up, chasing & herding the group about (no contact). Pushed this way & that a few yards - no decision about direction. // Earlier a lone one ran past me & across 6' wide dry creek; stepped in it without pausing - do not try to jump ^{small} streams. // 10:25, now 15 in the compass branch, about where before. 100 yds. toward Center Knoll one was chasing group several - apparently 1 of 2, ^(10:27 - 8 prove) chasing group of 5 A+K (or the 4 belongs to them; not chased). The 5 going over ridge of Center Knoll, the chaser runs to the 15, tail up, & drives them 100±! They move at slow walk; prone over rise. Then (10:30), the 5 A having again come over ridge 50 yds. from A+V, the ⁰⁷ passed back toward the 5; at 100' they retreat over the ridge of Center Knoll again. The young were 2 1/4 minutes. Stands  angle,

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legs not bent. ♀ put muzzle to nuzzling young once, ears back. Then
 (perhaps the 9:35 ♂) young + other 2 graze. The 5 are atop Center Knoll, 75 yds. away, 1
 prone. 10:37, ♂ of the 3 runs toward the 5; they retreat 50' ^{after} when ♂
 stands 15±' from them. ♂ stays until 5 further away over ridge, then at
 10:40 starts back to ♀ + young one. 10:42, large group her 16-14 prone,
 2 grazing. // 2 grazed 200 yds. from me. my movements brought
 my from me. Descending series 5 notes of this whistle in 5
 2 seconds - "la leal fi fa". Then it retired 50 yds. + grazed. //
 10:50, 4 of 16 grazing, others prone or (2) lying on sides with necks
 up. The 5 not in sight. The 2 grazing but young not seen
 near them (over ridge?). 10:53, the ♂ (of 2A14) walks 50 yds. to
 ward the 16, defecates, then gallops to 50' from them. They pay no
 attention - none rise. ♂ to walk toward - the prone rise.
 all move slowly, occasionally graze. ♂ prances about + occa-
 sionally dashes after one which lags behind. Group moves
 about 50 yds. + grazes, the lone ♂ standing 30' away (tail
 now down). Lone ♂ grazes + 11:03 walks back ^{toward} to, etc
 ♀ about 50 yds. (still 100 yds. from her); eventually lies prone
 there - still at 11:17. Gradually 5 grazing vicuñas come closer.
 ♂ arose +, tail out, walked to about 50' from them + stood. ♀
 also noticed + walked 50± yds. to 20±' from ♂. No chasing.
 ♀ + ♂ stayed near the grazing ones - they did not retreat - + ♀
 back to former site (11:28) (young one has not appeared). I
 went down to Horse + returned to spot overlooking E. half of
 S. Pasture at 1:10 p.m. At center was dense group 21. There
 were other groups 3, 4, 5, + 4 (last 2 on Center Knoll). The
 former group 15 presumably part of the 21, this group in ground

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hollow, 200 yds. ENE of site of the 15. Nearest to the 21 is group 4, one 100' from nearest of 21 + other 3 (pres.) 100' further away. Of 21, 3 down, others defer., 1:25. Three nose a face side. Two give "wolf howl" after. One shakes head rapidly side to side after moving. nosing. The 4 nr. 21 may be ^(red) ♂ + 3 ^(pale) ♀. Two of 21 walk away when the presumed ♂ walks closer. 1:30; 7 of 21 down; 2 or 3 rolled; one rolled clear over dorsally. One of 21 run 5± yds. after 3 in turn. One of 21 defer.; 2 roll in short grass. Group spread 75 yds. 1:40, ♂ of the close 4 began chasing segments of the 21. It worked up + down the line, running 5 or 10 yds. toward individuals or small groups, causing prone ones to rise, until all driven 50± yds. from the 3 ♀♀. Movement ^{of 21} about 50' to N. ♂ then to 3 ♀♀ + all walked east slowly to E. Several of 21 started toward at walk - ♂ returned 50 yds. + chased them back 50'; they "rearing" at 15'. ♂ tail vertical + forward of vertical in chasing. By 1:50 the group of 4 200 yds. away. One of group 3 about 100 yds. away ran 50 yds. toward 21 while they were being chased, tail high. It chased group, herding them to eastward, at 1:51. Occas. 1 or 2 break out of group + chaser race to head them off. Group 21 continued down canyon and where grazed where they had been, 100 yds. from its 2 (pres. ♀♀). Another 3 about 50 yds. from this 3 was not attacked. 21 down same draw where 4 + 15 separated this morning in ragged file 75 yds. long (1:56). 5 rolled at once, then at least 4 more. One rolled over ^{completely} quickly + rose, then stood, just flying. 1:59, last of 21 out of sight (down hill where 4 of 11 went after a.m.). The ♂ of 4 band still separated from other 2. 2:00, the ²¹ group was

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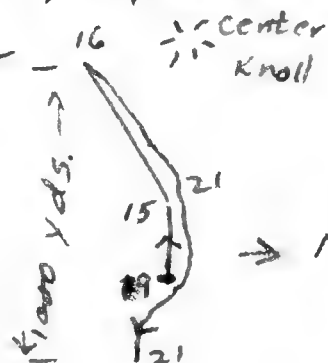
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Ariconia, 15000', Dpto. Puno, Peru.

stopped 100 yds. down slope from where disappeared. Total move 500±

yds. 2:10, they moved another 50 yds. down slope (w. slope off W. side

movement since arrival S. Pasture this a.m.



of SE Canyon). Dampener + gramma here. Last

move downhill helped by one chasing, it

appeared, but still only 21 present. 2:30,

two walked 50 yds. uphill from group, 1

at a time.

after other. These 2 descended slope to S. The

19 went another 150 yds. downhill toward ^{bottom} SE Canyon (200 yds. below the 2 at 2:35). The 2 went SE downhill so 1/4 mile S. of the19 at 2:40 p.m., then over rock outcroppings into ^{side} canyon ~~bottom~~, left gramma

met for rocks. 2:53, a whistle, & a big ♂ pranced up to the 19

grazers. They were driven about 75 yds. NW up moderate

slope before big ♂ turned away. Tail of roanid male  in

side view; a central bend. Chasing ♂ holds head high, ears up, &

most should have ears down, heads lower, so latter appear

smaller. Big ♂ remained 50 yds. from the grazing 19. 3:07, the one

returned and herded & chased band up slope. One left 50' behind

chaser ran past it to group. Sides of chaser distinctly more short

than sharply two-tone than of the others. No kicking or fighting

back. Drove group up slope 100± yds. (to where were before last

move downhill). Chaser rolled 2 separate X. Broke off chasing and

galloped 100 yds. up to edge S. Pasture near Que Creek - another

single standing there. Followed it - the 2 moved 50 yds. up ^{the} and

pasture, & both grazed 10' apart 3:20 p.m. Group of 19 grazed at

site where left by chaser. Usually feed in ragged line

oldest, all facing one way. Proceeded three to rocks, then one,

and the group within 15 sec., turned about to feed facing

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away from rocks. Fog coming up canyon from S. Sky clear haze with 4/10 cumulus + alto stratus. Most of groups worked downhill; upper segment walked down to them when gap 50'. The 2 on S Pasture together as before (♂ + ?) (3:37 p.m.). 3:45, the other of 2 walked up canyon; the ♂ (dirty neck from rolling) walked to edge hill as if to look at 19, then walked up draw (to WSA) after other, stopping to defec. on way. Occasional clouds fog coming over. 3:53, a lone one (prob. male) appeared 100 yds. downhill from 19. It ascended slope 50' toward them + stood, looking, occasionally changing position a few feet. 4 p.m., lone one walks toward group, occasionally stopping. Stops + rolls after 100'. 50 yds. from group they walk uphill. The one gallops after. Grapple stops when it does. This too more satiated on tan sides than those of group. 4:05, the 19 had moved 100 yds. up onto edge S. Pasture. Lone one galloped down slope away from them. It joined 3 others on green flat 200 yds. down slope.

July 9, 1951. Went in search of the 19. Clear calm morning. Groups of 7 in draw 1/4 mile S. of House (also at 4:15 p.m. yesterday). 4 on slope where 19 had grazed yesterday afternoon. at 8:15 the 19 were at NE edge of S. Pasture, 100' N. of Ice Creek, 300 yds NW of where ^{pasture} seen last evening, on flat ground, faintly + greenish brown short grass. 8:30, 9 down (3 prone; others on sides). I sat against rock on a hill 500 yds. S. of group. One group 5 stood only 100 yds. from me + stared (apparently 107, 4 ♀♀). ♂ of group, ears back horizontal, head level, twice faced me 6' away + it retired - possibly spit at it. ^{They} Walked away slowly - 6 steps/5 sec. 8:41, 15 of the 19 down (1 neck + body flat on side, 2 on side with neck up, others prone). All within 100' drain. I drew a warbling descending whistle from 3 near

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July 9, 1951

Aricoma, 15000', Onto. Pung Peri.

center of S. part S. Pasture, 250 yds. NW of me. 8:55, only 3 of the 19 up. 9:05, only 2 up (all but 1 of others prone). 9:10, 1 defec. 30' up slope from group, then return. 9:18, all but 6 of 19 up slowly & walked 30' across dry pond. One picked up piece dry *bo' alga* (?) in mouth, carried it several feet, & chewed part of it. Last one up 9:22. Whole group moved 50 yds. E. of former grazing & lying site. After pause while (some defecated), bunch started E. at slow walk in single file. Leading one 100'± ahead, more separation than between any others. By 9:34, leader 500 yds. from starting point & group still going. 9:40, last of group over a ridge into draw where I saw 6 or 6t, one with tail up chasing others. I moved a few hundred yards E. 9:50 counted 25, an uphill one having tail up. Visibility obscured by rocks. 9:58, the group ran downhill to flat at edge of SE Canyon. One, tail arched, chased them, then retired down canyon. Now 26 in group, increase of 7. They ran across lower part Lee Creek, 10' wide, stepping in the water. Total movement of the group 4:20 to 10 a.m. about 3/4 mile, none not initiated by being chased or frightened. The chaser grazes 100 yds. from the 26. 26 grazes on green flat (10:05). Now fair breeze up canyon. 10:10, group moved 100 yds. to flooded area - half surface of water, green mounds ^{protruding} among & above. Several apparently drank keeping muzzle in water 5-10 seconds. Several out 5-10 yds. in flooded area on the small islands (2-3' diam.). 10:15, brief fight. One, tail up, straddled other from rear with forefoot. ~~Then~~ group moved 50 yds. S. to edge of SE stream but were soon chased back 50 yds. N. by one with tail vertical (10:18). By 10:23 the one had driven group 100 yds. downstream (to E.). Those in a hurry jumped across stream - about

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7' - with ease, forefeet landing about together and hind feet pushing back together. Walking over stepped into center of shallow running water.

10:25, the 26 grazing both sides of meandering stream, the chaser grazing 50' away. 10:30, chaser drove 9 about 50 yds. away from rest of 26.

10:35, the 2 parts 100 yds. apart, chaser halfway between. By 10:40 chaser had gone to big group & chased a few, then driving them toward the 9. One, not of 26, only 50' away, not chased. Chaser usually stands near moving group & once in a while makes a feint or chase - never touches chased one tho more sometimes 5' from tail. Group had moved about 400 yards under urging by this one. Chaser had oft looked toward slope to S. About 10:41 it ^{walked} toward this slope, stopped to defec. on rock, galloped to lower part of slope (100 yds.); I saw 3, prone, 150 yds. up this slope (chase of chaser?).

10:48, the 26 being chased back upstream by one with tail up. The new chaser stood 5 yds. behind line of grazing 26; they had moved 100 yds. up canyon by 10:50. 10:51, the chaser on hillside ran back to the 26 & herded & chased them. Other chaser just stood, tail up; it looked 300 yds. down canyon at another 3 on hillside. The 26 remained on peninsula on curve of stream in tight groups, the 2 chasers 10 - ~~to~~ 50' away, tails (T) arched a bit. Lone vicuña from other side stream also approached, tail out - so 3 aggressors. A few of 26 crossed stream & were so mildly chased by this third one. Pursued one holds head higher than local back; chaser lower. One chased across 2 branches of stream which it leaped with ease. Some stand in or walk across 6-8' wide running stream. 11:05, still much confused pushing about of 26 by the 3. Then getting a few yards from compact herd head broke for

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Aricoma, 15000', Depto. Puno, Peru.

group as soon as chased. If chased hard, this means a circular route back to herd. // By 11:15, both ~~gg~~ groups 3 on slopes had descended 100-200 yds. to edge flat & were grazing. A few times all 26 on one side of stream but some chased across again. After one chased by one, then another, of the aggressor. 11:21, 2 broke out of group & ran 100 yds. to steep slope of sidehill; one of chasers pursued 50 yds., then stopped & went 50 yds. down canyon toward a group of 3 200 yds. away. Main group crossed stream & headed S. to edge ^{steep} slope (100 yds.), still chased by 2 of the 3 (the one returned from down canyon) (11:25). 11:30, only one ^{herding} ~~chasing~~ the 26, the other having walked halfway (100 yds.) up canyon toward 3 grazing there. 11:34, the one had herded bunch, 50 yds. up steep slope, about 75 yds. up canyon along slope contour - this made bunch approach chaser which left & he returned to herd them about. The 2 (see 11:21) which had left band rejoined at about time it reached edge of stream plain. 11:44, one aggressor had walked slowly 100 yds. down canyon along contour but another still herding the 26 from time to time. 11:50, the 26 in a ragged file angled up slope (going E.), one aggressor watching from below; now 200 yds. up S. side slope of SE Canyon, going across green mat, tall bunch grass, fine & coarse rock slides. The aggressor went past group & chased leader 50 yds. ahead & 50 yds. uphill, following it, but when rest of group continued along contour the chaser descended & chased leading one & others. Group angled up slope so all together 11:57, 2 50 yds. up steep sidehill, aggressor close by and occasionally giving vigorous chase. 12:15, the group had moved 300± yds. along

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and up slope, to E., & was still being guarded by one chaser. I went back to House & from there, at 1 p.m., saw group (26) about 100 yds. down & across (to E.) slope from last position. 1:30, about 100' up canyon on same contour, grazing, one prime on rock. I went to point 600 yds. (across canyon) from group. 2:10, at same location but a chaser present, occasionally running after one or another. Air line this group about 1 mile from 8:15 site. The chaser herded group about 75 yds. along contour, now going back to W., & the group continued on another 75 yds. Then chaser, 50 yds. behind, again ran up to group and ~~was~~ ^{chased} a few individuals. At 2:30, about 300 yds. W. along slope from 2:10 point, & chaser had walked back E. about 200 yds. 2 of 26 prime 2:31. These soon up & all grazed on & near green mat on hillside. By 3 p.m. group had worked 100 yds. to E. along slope contour and had spread 100' down hill. In moving forward a few walk a few steps & graze, then a few others advance, randomly. 3 p.m. a lone one came up slope & stood about 10 yds. from group about 3 min. before making a mild chase, driving group to E. along contour. Then more prowling after group, not vigorously chasing any one. 3:05, group back at 1 p.m. site. Chaser loitered 50 yds. behind, then pranced (slow gallop) up to them again. Group started, ragged single file, angling somewhat downward. as they crossed bare gray ground at least 7 rolled briefly. 3:10, ~~all~~ on a flat green mat 300 yds. E. of 1 p.m. point, 200 yds. up slope from flat of SE Canyon bottom, the chaser still with them. 3:12 the chaser started away from bunch to W. at a gallop as if it saw something. It stopped about every 200 yds. for a minute or looked. Stopped & drank at trickle among green mats. At

Vicina

July 9, 1951

Aricoma, 15000', Santo Domingo J.

descended slope on ^{gentle} traverse & finally, after about 900 yds., came near a group of 3 prone. Did not stop but went toward N. side canyon floor at a wall. The 26, on brown short grass ^{w.-facing} slope, grazed where chaser had left them. Up-canyon fair wind continued. Mild head & neck watching of 2 of 26. Some defec. No change

3:29. at

July 9, 3:30 a lone one, tail up, approached & started driving 26 to W. along contour. Several stopped at a dip in green mat as if to drink. Groups moved about 100 yds. Soon chasing abandoned & chaser grazed 10-20 yds. from group on green mat. Bunch reluctant to leave greenery? - or bolder late in day (& little undisturbed feeding today)? Still grazing 4 p.m. with no chasing last 15 minutes. I left off watching. At 5:30 p.m. the group was compact, about 100 yds. E. last position, still high on slope, apparently grazing. About 4:30 a group of 11 at N. end SE P side - the 11 or so of other part bunch 30?

July 10, 1950. At 6:30 a.m. & again 8 a.m. searched for the 26 from across canyon but could not find them. They may have gone ^{to E.} 1/2 mile down canyon & thus out of sight. // As I was sitting on ground a large lone ♂ walked to 70 yds. of me, squeaking hoarsely. I whistled back & it walked quickly 10' toward me; then again. No facial change apparent when calling but abdomen (diaphragm?) drew in with each call. // Three times during day saw 2 groups near house or in so draw ³⁰⁰ ~~200~~ yds. NW. They appeared to be the usual 5+3 but with additional one keeping close to the 3.

July 11, 1951. About 7 a.m. & 11 a.m. saw the groups of 5 and 4 (3+1?) about 100 yds. N of rock shelter.

Vicugna

July 12, 1951.

Aricama, 15000; Dpto. Puno, Peru.

The groups 5 + 4 about 50 yds. apart near Rock Shelter at noon. Also seen 7 a.m. About 3 p.m. 2 men + boy came to our camp, men dressed in some sort of uniforms and carrying a large caliber rifle. They had killed a vicuña close to our camp. ♂, apparently young; testes 17x13x10, no external bulges. Located at top rear of legs in hairless area. Put out in Bouvier. Saved skull. (They had also killed 2 huemul near the summit, this side. One ♀, ut. horn 60 mm., no embryos or scars. Saved ovaries. Nipples about 1 cm. long, 4" apart between hind legs. Saved skull. Other a ♂, horns broken off. Testis large and external; 65x35x30 mm. Saved piece caput + testis.) They said ~~several~~ for One went off after another vicuña while I was with them. Our local 5 + 4 had gone from vicinity. One man told me bands 30 to 50 all ♂ to ♂, small bands had only one ♂. He said Indians sought young for their hides. Young born February he thought. These men had no hesitancy about shooting vicuñas or having it skinned.

July 13, 1950. Group of 25 or + on slope 100 yds. ^{SW}SE of House at 3 p.m.

July 14, 1950. Group 6A + 2Y seen near Cuzco. Another place 2A + 1Y. A single young ran parallel to road & gained on us at 20 m. p.h., then crossed road ahead of us. It appears that more young seen near Cuzco, perhaps because Indians do not hunt young near the towns.

Door Vicuña

July 13, 1951

Ancomq 13000', Pto. Puno, Perú.

at 8 a.m. the groups 5 and 4 (one more 100 yds. from) near rock shelter as usual. Killed ♂ apparently not of these groups. At 7:30 p.m. went to vicinity rock shelter to look for vicuña by moonlight. Drew calls from 200 yds. W., then saw 4 or 5 there, walking & running. Couldnt find animals without disturbing them.


Group A

July 16, 1951. At rock shelter 7:30 a.m. One group 5 on slope 200 yds. to W. (included 1 apparent yearling). Another group 5 about 50 yds. SW, one of this group chasing a sixth to N. There was pig-like grunting when 2 were close. The remainder of group B followed the chase and all 6 finally grazed on green damp slope where the two used to graze often (S. of Indian markers). Group B had young apparently of this year the fairly large ^[smaller?] (2/3 or 3/4 adult size), & larger than the yearling of the former trio; ~~so probably not the two grown in size (the adults range).~~ Group B may be two now increased to 6. One of group A walked to group B, tail up; headed off by ♂ with tail up of group B & walked back up slope - no chase. 8:05, one of A to 30' of B; ^{one of} ♂ of B ran a few steps toward it. The one of A retreated, & another (♂?) of A ran between the two. Then 3 of A grazed 50' from 6 of B. Possibly B's old trio augmented by 2A + 1Y. Rather than handing up ♀♀ into their band, ♂♂ may guard choice piece of grazing area & chase off others but occasionally accept a new ♀. Since 7:30, one of group A prone (highest on slope, has not been in encounter with B). 8:10, one of group B prone on small patch loose bare ground on slope. One shook body while standing. One rubbed neck on small tall bush as grazed beside. One brushed

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Aricoma, 15000', Depto. Puno, Peru.


side head on 6" high grass. One drinks from puddle in mat, nose down 6± sec., then slowly raised, water dripping from muzzle, & nose or lips worked several times slowly (½ sec. per). Now fairly sure of 1 yearling in B group & believe this group the augmented trio. The shooting of a young ♂ nearby may have caused some shifts. A group has 3 smaller than the ♂ + another - so very probably same 5 as I watched earlier this month in same area. 8:28, prone one of A up, walk 100' SW, apparently drink (2X, 10± sec. each) in pool in green mat. Another of group A lying on side, legs . 8:30, a second adult ♀ of B prone. Others of A move SW so all in 100', 100 yds. up canyon from B. 8:37, second prone of A has neck outstretched, lower jaw on ground, eyes half closed, ears vertical & occasionally twitching (this prob. ♀, largest prone & highest on slope ♂). 8:42, ♂ of B up & started grazing at site. 8:45, next largest prone up & grazing. 8:55, A walked toward B group led by one (♂?). ♂ of B walked 50' down slope to 50' ahead of stopped A leader. No tails up. B leader grazed & walked away several yards. One Two of smaller of A down prone, then (9:01) leader too, then other small one. 9:07, one ad. ♀ of B prone, others grazing; prone on green mat, then down on side with neck also flat on ground. 9:15, baby of B down on side. Ad. ♀ puts nose gingerly to rump area several times. When ad. puts muzzle near baby's head, head pulled away by baby. All 5 of A prone by 9:15 (ad. ♀ & baby of B). 9:17, another ad. ♀ of B down, 10' from baby. Ad. yawns, muzzle up, mouth open, ears back, then shivers several times. A yearling of A, no front outstretched in prone posit., rolled over on side with neck on



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ground, drew neck on side slowly dorsally so as to scratch side of it on short grass. ^{then up prone again!} Just before rolling over yawned, mouth high and mouth open. 9:25, baby & last ad. ♀ to lie down ^{now} up & grazing, other still down. 9:33, ♂ of B walks 100' uphill to feces pile, nose pile, tail arched; spreads hind legs & defec. + urinates, then walks 100' along slope (away from group). Baby scratches lower cannon bone forefoot with tip hind toe without looking. Baby walks to 50' downhill from ♂. 9:38, the B ♂ prone high on hill above a rocky outcrop. Clear & warm today with little breeze. The baby too lay prone. One of lower & ♀♀ down on side (same as was prone?). All group A still down; one ad. rose ^{9:40.} It scratched head with hind foot, nibbled at a ff wrist, then pawed ground with toes on forefoot, then other, about 3x each, slowly, head low, then started to graze. Another up, then down again. Group B together 50 yds. ^(same pile) below ♂ on slope. 3 of lower 5, including baby, defecated & urinated (baby may be ♂). Ad. ♂ rose & came 50' toward group as if looking out. Another ♀ of B defec. (or repeat?), then yearling (definite ♀), then another ♀. Urine yellow & surged, ^{stream} for about 1 sec; same about 1 sec; then stream - more rapid change at end. 9:50, ♀ defec. + urin. same pile; eyes at level of back & head steady in front, ears partly back (). Meanwhile B ♂ prone facing away from group (uphill), chewing cud. 9:53, all A up & grazing. ♂ of B up & facing out from hill after sneeze from me (200 yds.). Within 1 min. ♂ prone, right wrist first, on flat level rock substrate, chewing cud. This ♂ again up & down by 10 a.m. Before then,

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one adult of A prone too, but up by 10:03. All except prone ♂ of B moved 50 yds. W. along slope by 10:05, grazing. 10:12, ♂ of B walked & slowly galloped down slope toward A, 50 yds. from B, & arched tail last 100' before stopped 30' from A. ♂ of A arched tail & stood, then group A retreated 5 ± yds. slowly. 10:15, 2 ad. ♀♀ of B prone on dust ~~bed~~ boulder on slope facing down hill; one soon on side with neck on ground but still chewing cud. By 10:18 a third prone near other 2. ♂ of B grazed near A. By 10:25, all but ^{♂ baby} ♂ of B prone, ♂ grazing 5-10 yds. from A group. By 10:29, one of B up & one (only) of A prone. 10:37, all of A prone; only 2 of B, then 1 (10:38). 10:47, last of B up ^{and} grazing, all A still prone. ♂ of B still grazes 30' from A. 10:52, baby close to B ♂; ♂ took a few quick steps toward it, put muzzle to its shoulder, then to its anal region (the baby raised tail and held neck stiffly curved ). One of A up. No change 11 a.m.; I left. These 2 groups show very little antagonism. 4 p.m., the groups 5 & 6 about 100 & 200 yds. N. of House. Often these on top of hill near rock shelter are low on hill in afternoon. 5 p.m., groups about 75 & ¹⁵⁰ ~~100~~ yds. N. of house, still grazing. Sunset 5 p.m. At 5:30 there were 5 about 75 yds. NW of House, 6 about 200 yds. N. The 5 disturbed mildly as I walked away from house (5:45). One of lower gave a cry and 3 upper ran toward it, then all 5 (group A) went up slope near rock shelter. Group B, 6, still down on flat 5:50 but saw me and group started NW toward S. Ridge. I went to rock shelter (6 p.m.) and saw group A 200 yds. WNW, still graz

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ing (moon cast shadow). There within 100' of where seen after 7 p.m. last evening and as could not see them at distance I moved to ridge opposite group. There, at 6:25, saw all 5 prone on gentle slope of N. edge of canyon bottom of draw. One stood + squashed at me (200 yds.) but soon prone again (lowest on hill).

Group spread 50' facing ~~up~~ ^{up or down canyon} gentle slope. At 6:40 p.m. one went 50' to feces pile, ^{down slope} apparently defecated, returned to place in group + lay prone. By 7 p.m., no change.

July 17, 1951. At 5:25 a.m., after moonset but dawning, went to place where A last seen - gone. Found them 100 yds. down + across canyon, prone on gentle grassy slope, at 5:40. Two stood, disturbed by me, but then prone again. I went to rock shelter. 5:55, saw group B, 6, on S. side of S. slope, grassy moderate slope, spread 50 yds., 400 yds. N. of rock shelter. Then grouped 1 (♂, lowest), 2 (ad. ♀ + baby), 2 (ad. ♀ + yearling), 1 (ad. ♀), ^{members of} highest, two's about 15' apart. All facing moon over across + down slope. All 11 still prone 6 a.m. 6:07, ^(ad. ♀ + ♂) ^{Then baby.} sun was on high peaks and 2 of B, rose + grazed. 6:09, ♀ ad. of B up slope 100' and defecated, the baby at 6:10 on same pile. 6:11, ♂, lowest of group, defecated on lower pile (50 yds. from upper). 3 still down of B, but all 5 of A grazing (since before 6:09). 6:14, yearling of B also grazing (2 down). Of A, two defecate + urinate on flat. 6:15, another of B up (1 down). ♂ went off 100 yds. to E. along slope from group; not

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followed. Saw 2 $\frac{1}{4}$ mile to ^{E.} of σ near N. end of S. Ridge flat. The σ walked, then galloped slowly toward the 2. at 200 yds. they started away but σ came to 30' of them and pursued over ridge toward Hut. All of B up 6:20 but all of A then prone! 6:22, σ returned to B along top of S. Ridge in sunshine. Earlier (before 6 a.m.) noted that prone ones chewing cud (still working on yesterday's food? or grazed some at night?). At 9:05 I returned to rock shelter & saw group A at site where settled down last evening, 2 ad. & 1 other ^{300 yds.} grazing, 2 prone. Group B halfway up N. side of S. Ridge, $\frac{1}{4}$ mile ENE of night resting spot. Calm, clear, warm. 9:17, 3 down of A including 1 adult. By 9:20 another down (all but ad. σ), & one up. One grazed while prone, then rolled half onto back on one side, then same on other side, then prone, ^{shook head,} yawned (mouth open 2 sec.). σ defec. & urinate. 9:23, only σ up. One of down flat on side, ^{side} and flat on ground. I Left. 11 a.m. 6 p.m., returning in car, saw 2 groups 5 near house as last evening. They moved up slope, slowly quickly left flat but slow moving on slope, as last evening. Full moon & clear tonight. What happened to 6?

July 18, 1951. Went to rock shelter 6 a.m. Group 5 (A?) on dry grass 75 yds. NW of shelter, 2 standing, but all prone within 5' of rocks (protection?) by 6:05. One defec. later 6 & 6:05. Other group (B?) on ^{S.} slope of S. Ridge about 50 yds. uphill from where highest of 6 yesterday morning at same time. One up 6:04 a.m. Both groups, members facing various directions - approaching en-

Vicugna

July 18, 1951.

Aricoma, 15000', Depto. Puno, Peru.

any thus seen better? All of group B within 5 yds. rocks (small boulder). 6:07, 2 more of B up. 6:08, sunshine first hit highest peaks. 6:14, 2 of B still prone; one walked 50 yds. to E. + defecated. One of group A rose + grazed. 6:18, all group B up (all but 1 of A). Group B moved 100' to E., ♂? 50 yds. ahead. 6:20, 1 of B prone - still at 6:26+. Cloud watching. ~~Baby of B not apparent - gone?~~ 7:50, group B 150 yds. N. of House, all grazing, baby + yearling present. 9 a.m., when driving out to road, encountered large group 25+, presumably all ♂♂, at N. end of S. Ponda. There went toward Pond. at 2:30 p.m., returning, we saw 28 next to Pond. Group of 7, one young but large, near waterfall in Loop. Returning to House saw 4 about 100 yds. NW - group 5 or 6 reduced? 3:45, groups 5 50 + 100 yds. N. of House, grazing.

July 19, 1951 at 8 a.m. went to rock shelter and saw group A 50 yds. to W., B 100 yds. to NNW, only 5 in B instead of 6. Clear calm morning. 2:15, at Rock Shelter, saw A 200 yds. W., 1 prone + 4 grazing at edge green mat. Group B, 5, 200 yds. NW on green mat (where trio formerly spent much time), 1 prone, 3 grazing, + ♂ 50 yds. to E. of group apparently looking down canyon. All A grazing 2:20. By 2:25 B ♂ prone where stood. ^{see sheet p. 101B} Group A moved 50± yds. E. to another sloping damp green mat. Now 100 yds. from B. but no reaction. ♂ + another of B prone as before, + 1 more. 2:44, ♂ of B grazing + all others of group down. 2:48, largest prone of B up + grazing. Another prone one rolled, up, shook out dust, grazed. This leaves ² (baby + yearling) ^{3.7} still prone. 3:03, other 2 of B up. ^{youngest} Baby to a dust spot,

[Subsequent obs. shows 2 imm., one younger than other - no sure juv. today]

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prone, then rolled on one side, shook head, shook ears fore + aft independent of head, then prone for 3 \pm min. before up. Closest of 2 groups about 50 yds. apart. 3:10, group B started down slope to ^EW. at fast walk. Became spread 100 yds.; some ran part way. Leader, apparent σ ad., stopped to defecate near foot hill. All to foot hill where oft seen in late afternoon. 3:17, the A group ran off together on same route. Stopped after 100 yds., at top steeper slope, & grazed. Soon σ tail arched, came up slope (of B?) and group A walked back halfway to starting point. 3:22, σ ran 50 yds. down slope, stopped & looked 3 \pm minutes, then walked to its group. A walked 50 yds. further to SW and grazed 100 yds. W. of Rock shelter. No change by 3:45 - no more lying down. Group B grazes 20' from 2 geese; no reaction. || 2:30, 2 of A rolled on one side on bare spots on ground. Another, then σ (2:31). σ rolled on side, stood up, then lay prone, down on other side & gave 3 or 4 rolls, stood, shook. 2:34, a small one of A ran close to an adult & seemed to be spit at. All 5 walked E. along side hill. 2 rolled briefly on short dry grass. One put neck & wrists to ground, then down on side, gave a roll, then up. || 4:10, harsh grating cry as one of B bitches at another. One ran 5 yds. tail up, chased by other. 4:15 - 4:35, lone one at NE side S. Ponds prone. || 4:30, about 12 in bunch near Center Kasall, 5 prone. So some lying down late in day. 4:45, overlooking half-mile long flat in SE Canyon. Saw group 4 (1/2 mile downstream from flat), 4+4+1+1+8 (σ ?), + 4 about 1/4 mile SW of flat. One lone one chased 8 up canyon 100 \pm yds. Two in group

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of 8 fought with necks. No change these groups 4:55. The lone one by S. Ponds walked away from SE end ponds. 5:10, saw fighting between ♂♂ groups A + B about 100 yds. N of Hauru. Biting of dorsal side necks, pig-like grunts, high shrieks like puppy stepped on. B ♂ seemed to win as A group retired uphill, ♂ occasionally making feint back toward other. After fight B ♂ had mouth hanging open as if ^{lower} lip torn or jaw broken - perhaps now easily distinguishable. B group partway up slope ^{toward rock shelter area} 5:20.

July 20, 1951. At 7 a.m. a group 7 100 yds. NW of Rock shelter - site of group B. At 8:15 returned there to watch. Clear, calm, warm. Group of ^(B) 7 ^{to} 150 yds. NW, group 7 ^(A) ^{ad. ♀} + 3 young (ish ♀♀), 150 yds. W., and one halfway between groups. Could not detect ♂ with injured lower lip; nor the baby of B (not sure of it since diminished 6 to 5[?]). 8:30, 4 group A moved toward in-between adult; it stood watching them, ears up, & they approached slowly, ears down. All 5 joined - apparently the middle one ♂ of A. Group A retreated 50' once when adult of B stood 50' from them. One of B prone, since 8:15, still at 8:40, 100' to E. of groups. Group A to about 50' from ♂(?) of B. after sev'l minutes the ♂(?) stood staring at them and they slowly retired to 100' away, up canyon (8:55). Adult of A prone. One of group B has light parts brownish, not white, in comparison to with other adults. Two of B young, one younger than other, but as no suckling perhaps youngest a yearling. Two of B defecated. ^a heard prone before 9 a.m. A younger one of A prone (so 2 down). Ad ♂ of

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A defecated. afterward nibbled side, with legs still in defecation attitude. It then walked ^{20'} 50' toward B and lay prone facing B. 9:08, 4 down of A, 3 of B. 9:12, left to last down of B up, + 07 down. All 5 of A down. 07 07 closest together of members 2 groups. 9:15, largest prone of B, over an hour down, rose. B 07 lay flat on side, belly down hill, neck on ground. A 07 also down on side. 9:25, B 07 from ^{fourth} ~~leg~~ side to prone; on other adult of B prone. 9:28, a third of B prone. 9:35, ♀ ad. of B went 50' to pile, defec., turned, nosed & tread pile, turned, defec. + urinated (squatting more for this). Then ran, tail up, toward group. 07 rose & came to group too, tail up, & a third in group had tail up. No chase; just 2 standing stiffly - then relaxed. 9:38, all 5 of A still down. All B were up; one down 9:38, another 9:39. Fair breeze up canyon. 9:42, third of B down. B 07 walked 50 yds. across + up slope to fecal pile, nosed it, continued on 10 yds. to another, nosed it, defecated, then 10' downhill + defecated on another pile. Then it was 100' from A 07, which rose, but no interaction. Another of A stood (9:48), + 2 more (now 5) of B down. Then one of B up (9:49). 9:51, all but 1 of A up. Another of B rose (:52). 9:53, last of A up; all grazed in compact group. 9:55, B 07 walked 10 yds. toward A group + they slowly retreated to 50' from him. An ad. ♀ of B rose from prone, walked 100' to pile, defec., turned 180° + walked farthest on side, turned 180° + defec. again, walked back to group (only 2 down; one rose). 10 a.m., B 07 about 50' from closest of A; all graze. 10:02, a second of B prone. 10:03, B 07, tail up, ran about 4 steps toward A, head low. A 07, tail up, followed when B 07 retreated. Again, about 10 steps + retreat this time. Some low

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directly

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guttural sounds heard. all but ^{one} of B, now, & there in groups, compact. 10:06, B ♂ walked toward A 100', & they retreated at 50' distance. A ♂ then ran after B ♂ which retreated - territorial line? One of retreating A's, as passed fence pile, put nose to it.

Brauns grazed 75 yds. apart; A widened gap to 100 yds. by 10:15. One wagged a single ~~tail~~ forward & backward 3 x; again, about 45° movement. An ad. ♀ of B defec. & urinated. at first defec. only, then turn partway about, tread forefoot atop pile alternately, then turn & spread hind legs & defec. again, squat further & urinate; ~~and~~ a few pellets dropped after urination. Another ♀ d. & u., defec. only first time, then turn & work feet, then turn & spread legs & urinate. The taking of squatting stance occurs after working feet on pile. Last one worked feet 12 x. Another ^{of B} defec. on pile 10 yds. from other. (about 10:25) ♂ of A ran to 100' from B ♂; latter stood, tail angled. Both then grazed. 10:30, 2 of B prone, none of A. One of B defec. Then another (young ♀) defec. & urinate, first defec., turn 180°, nose pile, work forefoot; turn 180°, d. & u. Another of B. defec. briefly. ♂ to this pile & nose but not defec. 10:35, one of A prone; now only 1 of B. ♂ of A ran 50'; head low, toward nearest one (♀) of B; it fled & ♂ of B ran 5 yds. toward other ♂. No close approach. Prone one of B up, then down after disturbance. 2 of A prone ^{at} 10:38; 1 second of B, then third, & 4th. by 10:42. 10:47, one of B, prone in a dust bowl, rolled in dust, then rose, shook, & grazed nearby. 10:53, 5 of B down. 10:55, one of B rose (3 down). 10:58, 4 of B down (incl. ♂), then 2 up. One of A up (1 down). 11:00, a third of B down, on dust bowl,



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and rolled briefly 1 side. By 11:02, 4th of B down. 11:10, 2 of A down; 07 of B rose, grazed (3 down). All of A up 11:14, moves 50' toward B + grazes 100' from them. 11:16, only 2 of B still down of the 12. B 07 runs a few steps toward A, tail arched, + A group retreats a few steps, A 07 chasing B 07 back. These encounters near line of those earlier today. Prone ones of B up. 2 roll on dust spots. B 07 stands 20' from A; makes short dash 10:19 + retreats to 10 yds. Another dash - about 2 steps - and near members A start, but only move a few steps. By 11:22 another of B rolls in dust; 3 of B prone near dust lanes. By 11:23, one of prone rolls in dust, then stands. One of A prone. B 07 walks to 100' E. of A. One of B paws dust bank with 1 forefoot, then rolls, rises. Prone of B rises, walks 6', rolls in dust 1 side, then other (over ventrally). 3 of B prone 11:27. By 11:33, B 07 ^{all up + grazing.} had walked 100' to rest of group; A group 50 yds. to W. 11:34, a fourth of B prone. 11:38, one of prone B up (3 down), then another. 11:41, one of A down, ^{then another} (still 2 B). 11:46, a third one of each group prone. 11:48, 4th of A down. 11:54, a fourth of B ^{down} + longest prone up. 11:56, last of A prone. 11:59, one of B up (2 down). || Mary watched 1:30-2:40. At 1:50 I noted both groups near house, A about 50 + B 100 yds. N. When Mary returned to house she slightly alarmed groups + they returned uphill. At 2:50 I was at Rock Shelter. Group A was 100 yds. to W., B 150 yds. to NW. Buge up canyon; 1/10 annulus. Two groups 150 yds. apart. 3 p.m., 07 of B walked 50 yds. from group, across + up slope (to E.) over rocks. Lay prone facing down canyon. Other 6 continued to graze + did not follow. 3:18, one, then another, of B defecated near

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pile, then 3 lay prone (4 incl. ♂). By 3:22, 2 more d. + u. same pile. a fifth prone 3:23. Whole B group within 50 yds. distance. Group A moved 50 yds. toward B + grazed on gentle slope of green mat. 3:27, only 1 of B still up. Group A moves 20 yds. E. along flat. Leader rolls on both sides, then stands - 15 yds. from A. At least 2 more of A roll in dust. One prone of B walks toward ♂; as it pass another prone an, it rose quickly, came back - may have spit. All of group B ^{up +} near ♂ + perhaps going to walk down slope. 3:33, all A prone - B ♂ walks 50 yds. W. along ravine, defec. + urinates on last pile used by others, then dambell in slow gallop toward A. A all up + runs 50', A ♂ then turning back toward charr, tail arched. After 2 ± minutes standing, B ♂ runs back to its group (3 have tails up in group). B ♂ runs to W. side group + drives it a few yards E. B group grazes below rock outcropping where ♂ stands. 3:40, ♂ descends rocks to group. A group retreats 100'; 2 prone. One of B (♂) defecates briefly, different pile. 3:45, B ♂ rolls, pauses, rolls over on back to other side + up, shakes body (slight crouch), shakes head. a third one of A prone. 3:50, all of A up + grazing. ♂ of B prone 50 yds. toward A from its group. 4:02, 3 of A in turn defec. + urinate on same pile. Group A moved 50 yds. to SW - away from B. Two of B crossed low ridge SW of Rock shelter but returned back into the usual draw (possibly saw me). 4:10 B ♂ with group, grazing. 4:20, 2 or 3 rolled. Group B working slowly down slope. 4:24 one prone, rolled, up + to group. ♂ down slope to near foot, 100 yds. ahead of others, + group slowly followed. All near foot of hill by 4:30, 100 yds. N. of house. By circuitous route got 200 yds. E. of bend. They saw me + moved 100 yds. N. to foot of S. Ridge (now all in shadow). ♂ gave a screaming see -

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sawing descending call at me. I sat 200 yds away. Occasionally called at me but continued grazing. Mouth closed during call. The other 6 scattered 75 yds., all grazing diligently. By 5:30 groups had worked 50 ± yds up slope. Still grazing 5:55 when barely visible.

July 21, 1951. 5:55 a.m. at rock shelter. Saw 24 scattered 100+ yds. on ^{S.} slope of S. Ridge where group B has been seen at night. Lowest group of 6, then 25 yd. gap uphill, then 7 (5 almost touching), others to near top of ridge. They saw me - some calls; 2 or 3 stood - all down prone 6 a.m. Then saw, 1/4 mile further E. on ridge near crest, group of 7 (group B?). Seen on highest peaks 6:05. The 7 started W. along ridgehill. 6:06, 3 of 24 up, 6 at 6:07. Some defecated. Four again lay prone. 6:12, 07 (of B?) pruned to - ward lowest of 24 from E, tail up, & stepped 50 ±' from them. The 6 walked uphill to rest of group. The 07 stood 1 min., then uphill to 30' from others - they moved slowly uphill (all but 6 up). 6:19, only 2 of 24 down; all up & moving over top of S. Ridge 6:20. No actual chasing seen. B(?) group remained 200+ yds. from big bunch. 6:21, one (B or ?) returned 100' over ridge, defecated, then toward big group. 6:25, group A, 4 prone, 200 yds. NW of Rock Shelter, near edge of their "territory". 6:20, a lone vicuña was 150 yds. N. of House on green flat. I to breakfast. 6:36 saw 4 atop S. Ridge where big group had crossed (B group?). 7:20, I at Rock shelter, saw 4 on crest of S. Ridge near lower Indian marker (B?). A group same site as earlier, 3 prone + 2 grazing. 7:42, B? group 100' this side of ridge (one prone), only 4 in group. 4 of A down. By 7:50, 3 of B down. 7:53, all 4 of B down; still 4 of A. All of A up 7:54 & grazing. 7:58, 2

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fifth joined group B (from over ridge). One of B up - so 2 of 5 grazed. 8:04, only 1 of B prone. ♂ walked 50 yds. down slope toward me to feces pile; def. + urin. Others descended slope haphazardly. Now in usual territory of group B, 2 about 75 yds. from group A. Only 1 of 5 in B appears youngish. B ♂ had been 50 yds. E. of group. 8:18, walked to ^{near} group as if going toward A (at line of territory observed yesterday). A B ♀ def. + urin. B ♂ went to pile, nosed it, shook head + gave "wolf howl", twice (do only ♂♂ do this?). 8:22, ♂ continued on toward A, walking, then running (tail arched, neck low, ears back). It cut back sharply 30' from A + A ♂ pranced after it 20'. The 2 ♂♂ stood 5 yds. apart, grazed. The reaction of B ♂ certainly seemed to be to approach of A over certain boundary - as yesterday - and not to linear distance from B group or the B ♂ (beyond group from A). A ♂ retired to 50' from B ♂. Same 8:30. Clear, light breeze up canyon. Lone one within 100' of where seen 6:20 a.m. It gave sawing call at 1/4 mile as I stuck head over rock wall; local groups of course looked toward the call. 9 a.m., all A still grazing but 50 yds.

M.K.
notes

from B ♂ (where last). B group 50 yds. beyond ♂, 3 prone. ♂ below called when Carl went down, then B ♂ called just before he crossed. 9:10 All A moved 200 yds. left. ♀♀ in B moved over to boundary to join ♂, bunched up and stood without grazing; one made growling noise with head raised and ears back; one rubbed one hind leg against other hind leg. ♂ scratched front foot with hind foot. All grazed again close together. at 9:15 I discovered

(barn of June 21, 1951)

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MK notes ↓ that A ♂ had left ♀♀ and was 50 yd. from B group. 9:40 A ♂ moved back to own group. All A's grazing. B's all ^{prone} lying down except one ♀. 9:42 one A ♀ prone. 9:45 8 (part of big group?) appeared briefly over ridge 200 yd. below B's. 9:50 2 A's now prone, B's as at 9:40. 9:55 all the same. Carl crossed ridge below, returning. ♂ stood and looked but didn't call, 2 ♀♀'s also looked. 10:00

MK notes ↓ A's as before, B's all standing but one. 10:05 B's all up; A's all got up and moved a few yards. I left 9 a.m. to search other ^(N.) side of S. Ridge; Mary stayed at rock shelter to watch. I returned at 10:20 to watch. Then A 50 yds. W. of shelter + B 150 yds. NW. On my trip I saw 3 adults halfway betw. Pond + S. Pond (9:20). In Loop near waterfall saw groups 6 A's, the young nursing. On slopes N. side of Island Lake disturbed 28, many of them lying down. 9:30 saw 5, 1 young, 1/4 mile N. of Two Butts. These ran up canyon to stream. 9:35, at least 7 in saw draw below ^(E. of) Summit, 1/4 mile S. of Gray Rock (9 groups seen here weeks ago). 9:40, 29 on W. side of Island Lake, again alarmed by me + started toward S. Ridge slowly. 9:45, one departed from big group + ran 600± yds. W. to join group 3 near stream (or of this bunch?). The 28 scattered 200± yds. I walked toward them + they away at 200 yds. Vanguard reached crest S. Ridge, then all turned to W. and ascended N.

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side S. ridge toward rocks. Mary said ♂ appeared on ridge but turned back without being chased. 10:39, one of B prone, 2 of A. 10:44, second B + third A prone. B ♂ walked 50 yds. to E. to top rock outcropping + looked down canyon. One of prone B rose. 10:49, B ♂ sat prone on promontory. 10:51, another ♀ of B prone (3 of 5 down). 10:53, 4th of B prone. By 11 a.m., 3 of A up + grazing. 11:10, B ♂ up, looking down canyon. 3 or 4 of A down; ♂ 50 yds. to W. of grass looking toward ^{B45} approaching from W. along base rock side of S. Hill, 300 yds. distant. at least 2 of new 5 stop at one pile + defecate briefly. A ♂ grazes. ~~B ♂ ^{400 yds. to above lunch} ~~was out of sight~~ ^{approaching}~~
One of 5 shows other 4; they ~~cannot see intruders~~ and they run 20 yds. downhill. A ♂, below 300 yds., stands on ^{low} boulder, looking toward the ♀. One standing of B ♀ ♀ looks at intruder. Another of B rises. ~~B ♂ stands 50' uphill from grazing~~ ^{11:20} (all ♂ ♂? - all same size). ♀ ♀ of A remain prone. B ♂ apparently hasn't seen approaching 5. Two of new 5 roll in dust, vigorously, back sides! 11:27, ~~2 of~~ ^{2 of} 2 B ♀ ♀ prone, other 3 graze. Intruders 250 yds. up slope from B. B ♂ defec. + urinates, then walks 100' E. to its lookout. The new 5 prob. all males - appear uniform. Graze at upper limit grassy ground. 11:30, at least 3 A grazing, 1 down. Adult ♀ of B defec. ♂ approaches + noses pile, then runs after ♀ 50'; she fleeing. ♂ runs 50 yds. E. to lookout place. Two ♀ ♀ of B defec. + urinate - do not tread pile with feet but do nose pile. ♂ walks 100' back to pile, noses it, walks a few steps toward the 2 ♀ ♀ and they a few steps away, saw him. ♂ then back to lookout. Another ♀ defec. + urinates same pile. 11:40, all B ♀ ♀ W. to rock outcropping 50' downhill from ♂.

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♂ to crest S. Ridge, runs 50 yds. toward one 200 yds. down (E.)
 on crest. B ♂ stops 30± sec., then then toward other - it
 goes over ridge when B ♂ 50' distant. B ♂ stands on low
 boulder 30± sec., then over to N. side of S. Ridge (11:45). B ♀♀
 stay on rocks. B ♂ running back 11:46. Group A was 50 yds.
 away - saw my head over rocks - ran toward me - all of them -
 to within 50' and looked hard at me, ears . One finally
 gave coarse throaty call - about 5, maybe, in a second, followed
 by ^(high) ~~single~~ their whistles. Then walked away. // Earlier, 2 of
 B ♀♀ walked to 10' from brown caracaras perched on rocks
 near their feet. Bird turned head often. The 2 vicuñas looked
 hard at it & walked slowly toward it. Bird hopped away
 about 3' to new perch - finally left. // 11:54, group A filing
 to S. about 50 yds. SW of Rock Shelter - downwind from me
 but no reaction to smell. Two of B ♀♀ prone; not sure if
 ♂ has returned. 11:58, B ♂ back + apparently saw the 5 uphill
 from it as ran 50 yds. toward, then stopped (at one exposed
 on ridge 200 yds. uphill from B group. Group A did not
 cross ridge SW of Rock Shelter but grazed there; one prone 12:01.
 Fair breeze up canyon. 1/10 cumulus low to E. 12:02, B ♂
 grazed, walked E. - away from upper 5 (prob. not now visible
 to him). // I to lunch & returned 1:05. 3/10 cloudy then. Group A
 still near Rock Shelter - ran 50' toward me as I approached
 behind a rock wall. Group B 400 yds. N. of shelter, & grazing
 in a dry shallow draw and one (♂) near top of ridge 50
 yds. beyond (& higher). B near site where has bedded some
 nights. Group A rotated to 50 yds. NW of shelter; one

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prone by 1:15. 1:20, B ♂ defecated. 1:22, 4 of A prone. - 5 at 1:28 - 4 at 1:34. 1:45, 2 B ♀♀ lying on sides. 1:48, all A up. A third one of B down. B ♂ to crest of S. Ridge, 100 yds from ♀♀. A move 50' E., then 2 prone. One prone rolled, then up. One sawd ground some spot, ^{then} prone, rolled on side, stood, shook. Then all A up + grazing (1:52). B ♂ prone on level rock on crest ridge; only 1 of B still up. Grains A started down slope to E. Three stopped + rolled ⁱⁿ one dust bowl. Last quickly down + up there. Walked fast downhill (1:54). B ♂ immediately ran toward them from 1/4 mile away. Trailing one looked back + saw B ♂ 100 yds. behind, then scooted ahead fast. All ^A ran into draw, 50 yds. N. House, where they often graze. B ♂ pursued to 50 yds. from them (top of a ridge running NE from Rock Shelter) stood ³ 5 minutes, then prone by 2 p.m. All B ♀♀ up by 2 p.m.; grazed. 2:06, B ♀♀ walked down slope toward ♂. ♂ got up + walked down slope as if to meet them. A group moved 100' E. 2:11, B ♂ ran toward them, head low. They fled at 50' until 30 yds. away from B ♂. B ♂ stopped, walked back toward own ♀♀, nosed a pile, nosed me, defec. on another pile, then grazed on green flat 150 yds. N. of House. A group went on 50+ yds. over a ^{low} ridge to out of sight of B ♂ (+ me). 5/10 overcast. About 2:20 group A came back to draw just N. of House (50 yds.). B ♂ + ♀♀ grazed about 200 yds NNE of House. Same ^{sites} ~~relatives~~ these groups have been seen to use before. At 3 p.m. all group A ran down slope to near a large rock which seems to be on boundary A + B territories here. ♂ of B came running to the rock - A re-



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treated 20 yds. (one of A tail up). B ♂ walked off after standing a minute, defecated on rock 50' away, then walked away. | 3:35, B ♂ chased A, head low, no contact, 50 yds. NE of House. 3:40, another mild chase near rocks 75 yds. N. house. Then B ♂ saw another 200 yds. to E. & went off at gallop chasing it. As soon as B ♂ left, A ♂ ran 50' toward B ♀♀, 100 yds. away, & they fled, moving about 100 yds. NW. B ♂ quickly back to ♀♀. Heard grating cry, not high, from B. One made feint at chasing others as if ♂ driving them. All moved NW to 300 yds. N. of House at foot slope of S. Ridge. A remained 50 yds. N. of House. Another group of 4 was about 600 yds. NNE of House near a pond (off S. Pond). Haven't seen group there before - ♂♂? 3:58, A wandered E. into area from which had been chased several times this afternoon. B 300 yds. N. of them. B walked E., about 100 yds. by 4:20. 4:21, B ♂ came running 200+ yds. toward A. A started off when B 50 yds. away. B ♂ chased the 4 ♂ across same ridge as first after they came down today. A group managed to cut back to starting point (rocks) and 50 yds. beyond, B ♂ chasing. One screechy grunt (sigh) heard in there. B then stood on a rise 30 yds. from the A ♂ (by 4:24). 4:26, B ran to E. 100+ yds., tail high, as if running at one unseen to me. By 4:32 B ♂ was halfway back to its ♀♀. A group 40 yds. up draw from where where attack began. The group of 4 was at N. end of S. Pond area, 400 yds. NE of group B. One 150' away put muzzle to ground, then raised it a foot & made noise as of expelling air through nostrils - repeated 3x. By 5 p.m. B had walked to S. so that only 200

$\frac{52}{p(x)}$

$\frac{52}{p(x)}$

$\frac{52}{p(x)}$

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yds. N. of House. A was walking uphill 100' NW of House.

The 4 still on flat at N. end S. Pardo. Sunset 5:03 at house.

5:35, A 50' from former site. B had walked to W. to foot of slope; about where on hour ago. 5:50, group A gone - up hill? -

B 50 yds. further up lower slopes S. Ridge. By Weston meter light at zenith 1.0 ft. candle, 3.2 at brightest point of sky.

July 22, 1951. Clear. At 5:58 I was at rock shelter. 4 of B 300 yds. N., lying on dry grass gentle slope near toe of S. Ridge. 4 of A about 50' higher on slope than yesterday morning, on edge of area sometimes defended by B ♂. Probably ♂♂ absent from both groups. A group of ^{6 or 7} ~~about~~ was 300 yds. up canyon (SW) of A. A ♂(?), apparently from new group, charged down on A and chasing commenced with occasional glass-scraping throaty grunts & sometimes low-blast like cries. One Chaser tripped hind legs one by putting head under legs. Another time one bit dorsal neck other. Not sure if one did all the chasing. B male stood at a distance but joined in chasing when some on his territory. One chased B ♂ back toward its group. The 4 of A were driven up canyon to where the 6 or 7 were. Much chasing then within this group but no actual contests. Several ran off to SW. What remained was A group of 7 (6:00). Two appeared near B group 6:10 & chased by B ♂ up canyon; A ♂ chased them further up canyon. B ♀♀ calm through all of this - 200 to 400 yds. away. 6:20, all but one of B ♀♀ had been up; now 3 more. Sun on B by



Vicugna

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Ariconna, 15000; Depto. Puno, Peru.

6:24. B ♂ on crest S. Ridge 50 yds. uphill from ♀♀. A group still 7. Not known if new ♂ took over or whether the group all new or composite. 6:28, on 100 yds. up slope of S. Hill from A. A leader 50 yds. toward + others 30± yds., but no attack. High on partly hidden by rocks + near upper limit of continuous grass. 6:30, sunrise at rock shelter. 6:35, all 5 of B up. B ♂ occasionally walked over crest of S. Ridge + back. 6:42, lowest A prone, others on steeper dry, grassy + rocky slope uphill. Three of A roll on ^{short} dry grass. A ♂ came down canyon at base rockslide toward group A. A ♂ ran to a high point 100 yds. from group to look, then met the on-coming ♂ 200 yds. from group (6:55). A ♂ chased new one (chaser came up, chased one came back ^{nearly} flat on neck). New ♂ chased into A group and among group. It chased ♀♀ + was chased by A ♂. ^{Two} Three times the new ♂ herded 2 ♀♀ out of group but each time chased back toward group by A ♂ + ♀♀ rejoined group. Third time the new ♂ succeeded in herding 2 ♀♀ out, they showing no resistance, + started to NE along contour; A ♂ chased for 200 yds., then stopped. The ♂ + 2 ♀♀ ahead, proceeded toward crest of S. Ridge (7:03). 7:08, B ♂ met the 3 and gave brief chase; the 3 over S. Ridge. Final result: B group intact, 5 in number; A group increased to 7, then decreased to 5. Cutting out of 2 ♀♀ by invading ♂ witnessed, so evidently ♂ show attachment to ♀♀ as well as to a territory. Final 5 of A probably same as before. 11 to ~~break~~ breakfast + returned 8 a.m. B group

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Aricoma, 15000', Dpto. Puno, Peru.

near top S. Ridge as before, 07, 50 yds. from ♀♀, at crest ridge. A 200 yds. to W. of Rock Shelter on gentle grassy slopes of bottom of shallow draw. 8:20, I heard a cry from B and saw group 25± come to crest S. Ridge from N. The B ♂ ran 100 yds. to and into bunch; they walked away slowly back to N. B ♂ ran back to ♀♀ & they retreated 50'; then ♂ back to top of low rock on ridge halfway between 2 groups. 8:30, group A ran up canyon together. B ♂ whistled. I saw a man with gun, apparently an Indian, stalking B. I shouted at him & he fled over ridge. I followed but did not find him; perhaps he boarded a truck then coming up road. Five, probably B group, descended S. side of S. Ridge and ran up on hill east of S. Pato. A group of 12±, probably ♂♂, also ran onto this hill. I returned to House 9:15 a.m. Returned to Rock Shelter 9:50; no visitors nearby. 12 at E. side of S. Pato (all ♂♂), grazing in 2 groups of 6 about 50 yds. apart. 10:40, one came down S. side S. ridge through A territory & ran up canyon. Another followed 300 yds. behind, galloping most of the way. A & B not back. 3 p.m., group A 50 yds. NW of House and B 150 yds. N. About 4 p.m. A went over ridge to NW & B crossed lower down before 5 p.m. At 5 p.m. I saw both groups on this slope about 50 + 100 yds NE of Rock Shelter. They seemed little alarmed by me, in open, 50 yds. away, though very much alarmed by hunter. Probably they are used to my approaching from direction of House & Rock Shelter.

July 23, 1951. At Rock Shelter 5:55 a.m. Clear, calm, frosty. I blew a whistle from B group but none rose. One of

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July 23, 1951

Ariconq 15000', Depto. Puno, Peru.

A rose but down in 3 minutes. A was 200 yds. W. (where had been seen 2 previous evenings), 3 nearly touching, 2 about 20' away + 5 yds. apart, facing various directions. B was 400 yds. NE, ^{slope of} 1/3 way up S. Ridge, about 200 yds. below + to E. from where yesterday down, arranged . . . , facing down and down slope in various direction, 10 to 50' from neighbors, on open short dry grass. Frost on bodies. 6:09, sun hit highest peaks. 6:13, 1 B up, defe. ?, grazed. Another yawned, I muzzle high ϕ . 6:15, one of B called. All B up + run 50 yds. up slope. One (σ^7) ran 50 yds. further to today rise. More calls. All A rose + ran 100 yds. E. (to 50 yds. NW Rock Shelter) and looked to NW. Call from one of A (attracted by B calls?). 6:20, three of 4 B $\phi\phi$ prone again. A returned 50 yds. up canyon (saw me?). 6:22, then saw a fox ~~to~~ walking along foot rock wall 100 ¹⁰⁰ ~~to~~ ^{yds.} NE of Rock Shelter, 200 yds. from the B σ^7 on rise. Fox passed 20' S. of shelter, then to W. up ridge. 6:26, B σ^7 walking back toward $\phi\phi$, slowly. A moved 75 yds. further up draw (to SW). Sun hit B 6:27, A 6:29. One prone B rose. 6:38, all A ran 75 yds. up draw + seemed to look to W. Fox crossed 150 yds. ahead of them. They did not follow the one (σ^7 ?) watched for several minutes in that direction. 6:43, one more B up + graze (1 prone yet). 6:50, the one B still prone. 7:05, three of B prone, group same location. // Left for Cuzco + Sandia. Approaching foot Lake Arimara saw groups 4, 6, + 1 in open short ^{dry} grass country. Saw 2 ^{shortly} after crossing outlet stream, 4 near next lake (about 1 mile). At road junction (Pto Cuzco-Sandia) saw 22 in bunch,

Vicugna

July 23, 1951

Near Crucero, Dpto. Puno, Perú
and 2 (1 young; other ♀?) nearer Crucero on flat. None seen
between Sandia-Pato-Crucero junction + Sandia.

July 24, 1951.

Between Sandia-Pato-Crucero junction + Lumbani-Pato-Crucero junction
saw groups 7, 5 (1 young), 4, 3, + 1 in late afternoon.

July 25, 1951 about 3 p.m. noticed the two groups of 5, A +
B, near House in usual areas. Group of 10, all ♂♂?, appear-
ed over ridge 200 yds. SW of House, then receded. 6 p.m., at
least 2 of A ~~bed~~ prone 50 yds. NW of House on moderate
slope, dry short grass, slope facing SE.

July 26, 1951. 5:50 a.m., clear, calm, -4°C , $\frac{1}{2}$ moon. 50 yds.
NW of House, group A was prone, 10 to 20' ^{s. slope of} apart, when seen
last evening. Group B was $\frac{1}{3}$ way up _A S. Ridge, near where seen
morning of July 23. The 5 were 15-50' apart. A third group,
call it C, was $\frac{1}{4}$ mile NE of B, $\frac{1}{3}$ way from ~~top~~ crest S. Ridge,
6-20' apart, 6 animals (face various directions but none facing
one 200° sector). 5:55, 3 of A up + grazing (my disturbance?).
6:02, 1 of B up + all of A. 6:06, all of C still prone. 6:09, 4 of B
up. 6:11, 2 B down. 6:18, 3 B down. 6:20, one of C, all prone, graz-
ed, then stood + grazed. 6:22, only 2 B down. 6:24, one C grazed
prone; another submissed on ground; then second up, + third. 6:28,
one of C walked 60' away + defecated (first of this group seen
to defecate). 6:30, sunshine on B (3 down); 1 rose, 1 defecated.
Sun on C but two still prone. 6:31, another C up. 6:33, all C
up + grazing. 6:31, only 1 of B down; ~~one (♂?)~~ [♂] walked 100 yds.
across + up slope to W. 6:33, sunshine at House. Last of
B soon up. B ♀♀ worked toward ♂. 6:44, A group graz-

Vicugna

July 26, 1951

Aricoma, 15000', Dpto. Puno, Peru.

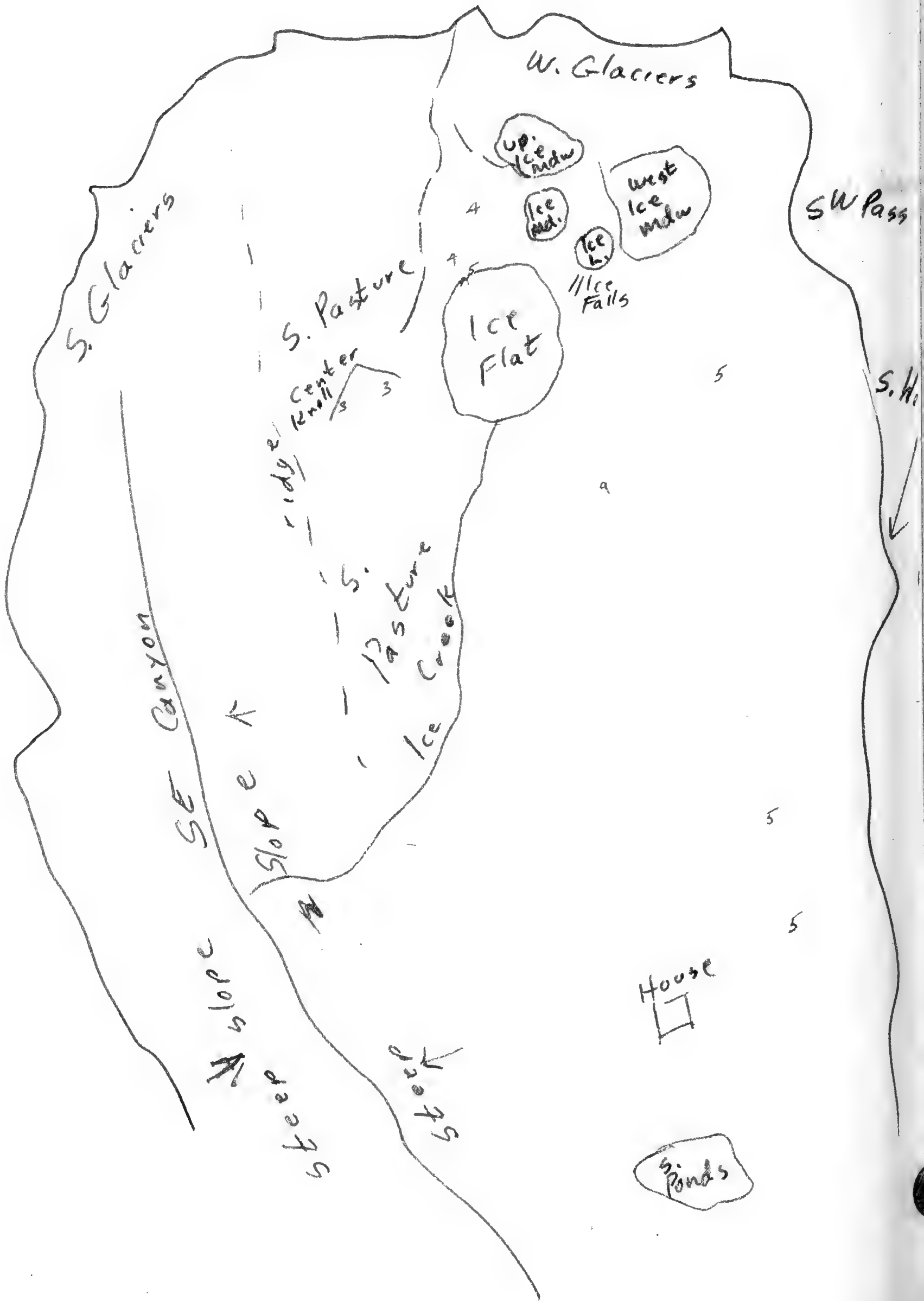
ing 50 yds. up slope from where slept. 6:50, B ♂ prone, ♀♀ 50 yds. down slope. Group C working eastward. By 7:05, B ♀♀ nearly to ♂. 7:09, a B ♀ prone 5 yds. from ♂. By 7:15 only 1 of B still up, others down near ♂. C group worked westward 100 yds.; 2 prone. 7:20, B ♂ ran slowly toward C. They started away at walk. ♂ stop 50' from for 1 minute, then resume again + they away to E. C met by ♂ from E. side (its group of 5 on crest ridge 200 yds. beyond). Both ♂ ♂ headed the 6, tails up, but no contact. The 6 subordinate - all young ♂ ♂? - no fighting back on tails up + lowered by back horizontally. ♂ sometimes stand on a boulder to watch group. 7:25, all B ♀♀ prone or lying on side where left. 7:30, C chased to N. side of crest S. Ridge. B ♂ stood on rocky rise of ridge. 7:39, B ♂ turning to group; stopped 100 yds. toward several coming up S. crest of S. Ridge. Then, 7:45, a diffuse group 23 ± ran toward B group. Much chasing back + forth, 2 or 3 doing chasing. B ♂ sometimes chased + sometimes stood with its ♀♀. a fifth joined, ♀♀ but left after 3 minutes. By 7:50 the big group raced back eastward along crest of S. Ridge. B ♂ followed but stopped 200 yds. from its ♀♀. Probably a large group ♂ ♂ had encountered group of the second ♂ (which had chased C), + this ♂ chased them vigorously. 7:55, group B together grazing, 200 yds. W. on slope of S. Ridge from where slept. A group out of sight of House now. 8:35, Out Rock Shelter. Group A all prone, 200 yds. to W. B 150 yds. NW, also all prone. Both near green mat on

Vicugna

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Aricoma, 15000', Depto. Puno, Peru.

gentle slope & within usual territories. All Behaving usual, & style, cheeks bulging, one chewing while lying on side with neck on the ground. 9 a.m., B ♂ rose & started grazing - all others still down. Fair breeze down canyon (from SW). 9:10, 1 of A up. 9:15, record of B up; youngest appearing one. 9:17, second ^A up. 9:20, 3, then 4 of B up. All A up. Twice one of A, younger one, ran 10± ft. at one of the Thunocoma (?) on the ground nearby & flushed it. 9:22, one of A down; still 1 of B down. 9:25, adult of A walked 50 yds. toward B, ~~defecated~~ ^{transferred feces} round ~~feces~~ ^{feces} pile, defecated (10 sec.), then on more quickly to 50 yds. from B. B ♂ came 100' toward it, tail up. A ♂ stopped. B ♂ grazed 50' from it. When A ♂ first approached, closest of B retreated 50' to center group. A ♂ grazed without more approach & B ♂ slowly E. with its group. A ♀♀ stayed at former site, 100 yds. from ♂. 9:30 // Drove cross country to S. to pt. overlooking east end of S. Pasture. 8 (or ⁹ ~~8~~, no young) in draw ¼ mile S. of House. 3 (1 young of year) at foot of S. Pasture. At SW end of Ice Flat, group 5, & 4 100 yards. from them on slope. ~~5~~ 5, ¼ mile up gentle draw to SW of these. Group of 7, in compact, on slopes near Ice Flat about 200 yds. SW of Ice Flat. About ¼ mile NW of Ice Flat, below foot of rockslides of S. Hill, group of 4. These all seen by 10:45 a.m. ~~1~~ Group of 3 from ½ mile NE of Center Knoll went to & over that knoll. Three (1 young) from foot of S. Pasture went about ½ mile to crest of Center Knoll (by 11:10). About 11 a.m. I shot at a condor & noise may have stimulated their movements. // 12:10 again at Rock Litter. A ♂ prone on flat 150 yds. to W. B grazing at about last seen site, 1 prone. 12:20, 2 B prone; 1 of A up.



Vicuñas

July 26, 1951

Aricoma, 15000', Dpto. Puno, Peru.

3 B prone 12:24. 12:27, record ^AB up. 12:30, 4 of A up, 3 of B. Then all A up + grazing, working toward B 100 yds. away. 12:37, A at edge of territory (where A + B ♂ met this morning). B ♂ walked toward A + stood 30' from. B ♂ tail up. Put head low + ran 3± steps toward A + they retreated (one tail up). Two of A several times ran a few steps at seed masses (?) on the ground as if to step on them with forefoot. 12:40, all both groups up. B ♂ grazed 15' from some members A. One of younger A, chasing bird on ground, got 10' ahead of B; B ♂ walked toward it; it retreated to its group. One of B lay prone on bare spot of ground. A seemed starting down slope to E. but B ♂ walked parallel. Then B ♂ on down slope at fast walk to afternoon feeding grounds, ♀♀ following (at least one stopped + rolled). A remained, grazing, 100 yds. NW of Rock shelter. 12:53, a ♀ defecated (of A). A younger younger one then moved pile + walked on. ♂ to 10' distant pile; nosed it + gave "wolf howl" 3X. Then tramped forefoot on pile, turned, defec. + urinated (large testicles visible). Then walked 10' to pile (where ♀ defec.) + defec. briefly, then on. 12:58, group A walked to brow hill as if to follow B. Rear ~~one~~ stopped + rolled. At brow hill 3 prone; at least 2 rolled in dust boulders. 1:02, all A up + now to W. up canyon again led by adult. Leader went 100' + lay prone. The + grazed, then (1:10) walked up canyon to 50' past prone one. ♂ kept on up canyon 50 yds. + stopped, looking W. - 9 vicuñas 400 yds. up canyon in that direction. Second ♀ prone. 1:20, ad. ♀ ^{then other prone one.} rose; A ♂ had apparently gone up canyon (hidden from me). It returned to 150 yds. from ♀♀ at 1:25. The ♀♀ slowly walked up canyon to 50' beyond the ♂; all grazed there at

Vicugna

July 26, 1951.

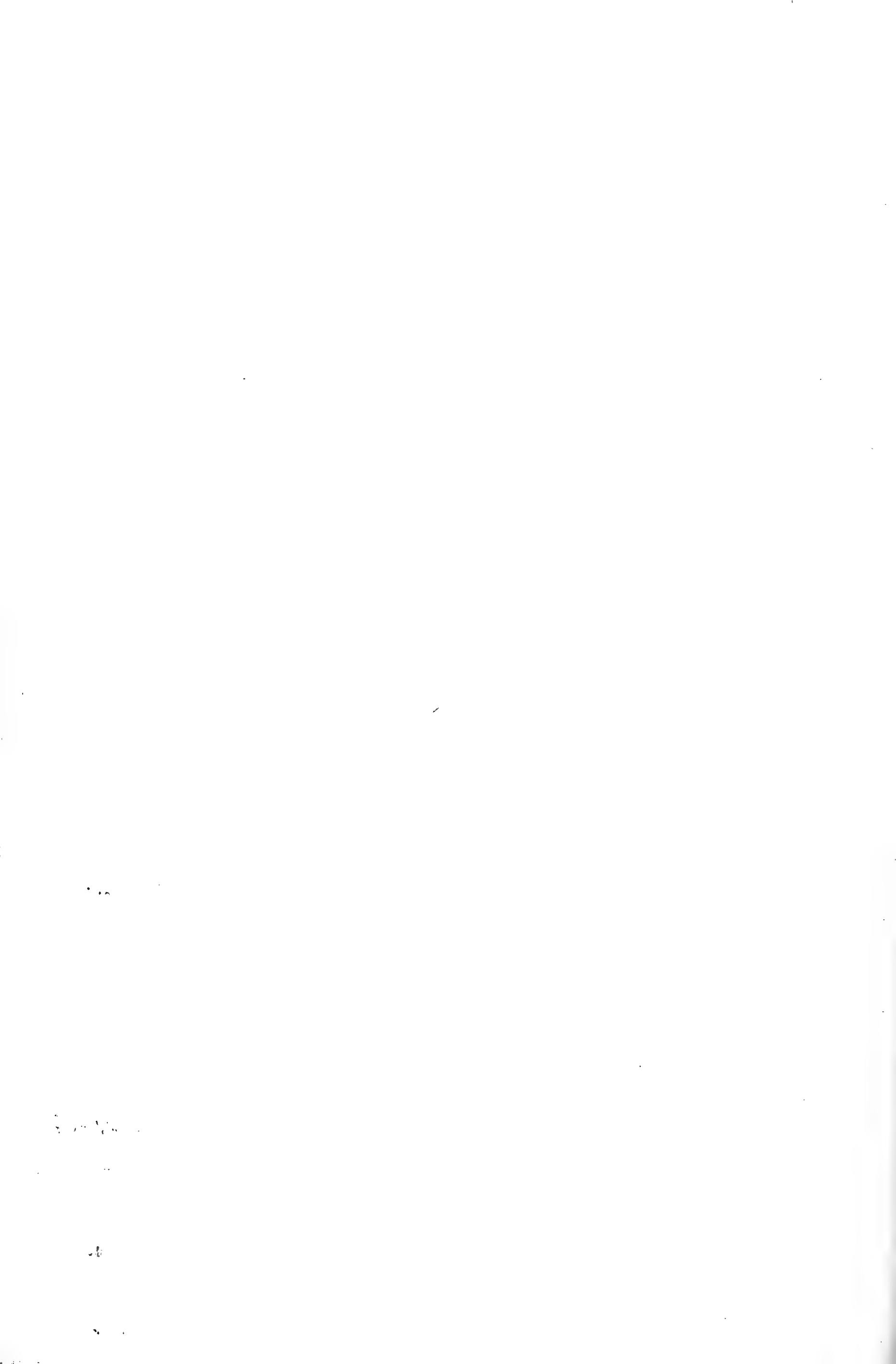
Aricoma, 15000', Depto. Puno, Per U.

1:30-1:40, all A together grazing, 200 yds. W. of Rock Shelter. B on slopes to NE near foot hill, 200 yds. away, on slope. 2 p.m., one of A prone. Then none ^{at} 2:05. One prone at 2:15. 2 prone 2:20. //

I went up canyon in search of the 9 but did not find them.

3:10, saw 5 (one 100' from nest) near brow of hill just NW of Rock Shelter. These saw me, at 400± yds., & ran down canyon. Later Mary told me she saw 5 run down slope and toward Pond, over brow of hill at N. end S. Pond, total run of 600± yds. at 4 p.m., group B about 400 yds. from crest on S. side S. Ridge. At 5:30, group A 50 yds. NW of House.

July 27, 1951. 6:30 a.m., the 5 of group A grazed 50 yds. NW of House, apparently having spent the night there. They circumspectly came - went to rock shelter but slightly disturbed A in so doing. A ascended across slope and went to green mat 150 yds. W. of the rock shelter, some 500 yds. B, also 5, was on S. side S. Ridge on gentle slopes 100 yds. from crest. The ♂ came 100 yds. toward A as latter ran toward its upper range. B ♀♀ followed 50±'. Smoky haze again this morning. At 6:30 a.m. No clouds. B ♀♀ worked toward ♂. One B prone 6:55. One small A ♀ defec. & urinate, walk 6' to another feces pile, defec. again a slight urinate, walks on. another defec. first pile (6:54). 7:00 a.m. ^{a young ♂} of A _A walked up slope, then across, then cut back & went over crest, 200 yards from group, ^(the ♂) following a slope. Another _A of group followed about 100 yds. then stopped. The rest of group grazed. About 7:15 they walked 200 yds. up canyon and grazed. 7:17, a group of 10 came over crest of S.



Vicuña

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Aricoma, 15000', Depto. Puno, Peru.

Ridge near lower Indian Marker and stopped after running 50 yds. along contour. Then two dogs came over ridge + toward the 4 of group A. At first they toward dogs 20'; then fled at 50' + dogs broke into voice. Group A ran up the canyon. Calls from B, probably at the 10 on rocks 300 yds. up slope. Two ran along crest of S. Ridge 100 yds. from B. + the 07 went halfway to meet them. The 2 went to + met the 10 without a fight. Then 13 fled along S. side S. Ridge + over the crest near B. A horseman with dog was riding crest of S. Ridge going W. Group B fled up slope + joined the 10, now running along contour up canyon. Two of this group ascended slides of S. Hill 100 yds. above other; 2 others went below. A small black dog pursued lower 2 + they joined the larger group. Another bunch of 13± came running over to crest to S. side of S. Ridge, high, near upper 2, + all joined (16±); these waited on slides + rocks high on steep slope. ~~went up canyon.~~ Horseman, an Indian with no apparent gun, rode at walk up the canyon just S. of S. Ridge. When he was 300 yds. beyond point below the 16, 2 of 16 descended + ran across the draw in southerly direction taken by group A. Many of the others followed, but 7 waited near base of slope (7:43), 5 in one group (group A? or B?). 4 of this upper group prone on steep fine rock + soil slide at 7:45. 7:50, 6 of the 7 on slope prone. Horseman out of sight up canyon. 8:40, returned to Rock Shelter. The 7 as before, 6 prone. Upper 5 all facing down slope, at least 3 with forelegs extended in front of bodies. I went into central part of S. Basin to look for horseman. At 9 a.m. saw the 5 vicuñas descending slope, + at



Glacier

Glacier

Su Canyon

Center Knoll

South (fairly flat) Pasture

Ice

down the line

SE Canyon

Ice Flat (marshy, thick grass)

Ice Falls

Green Ice mdu

Upper Ice mdu

Ice Lake

Ice mdu.

Cirque

G.I.

W. Glac.

West Ice mdu

below

Rock slides - shale

long Mdu

Rock Shelter



House

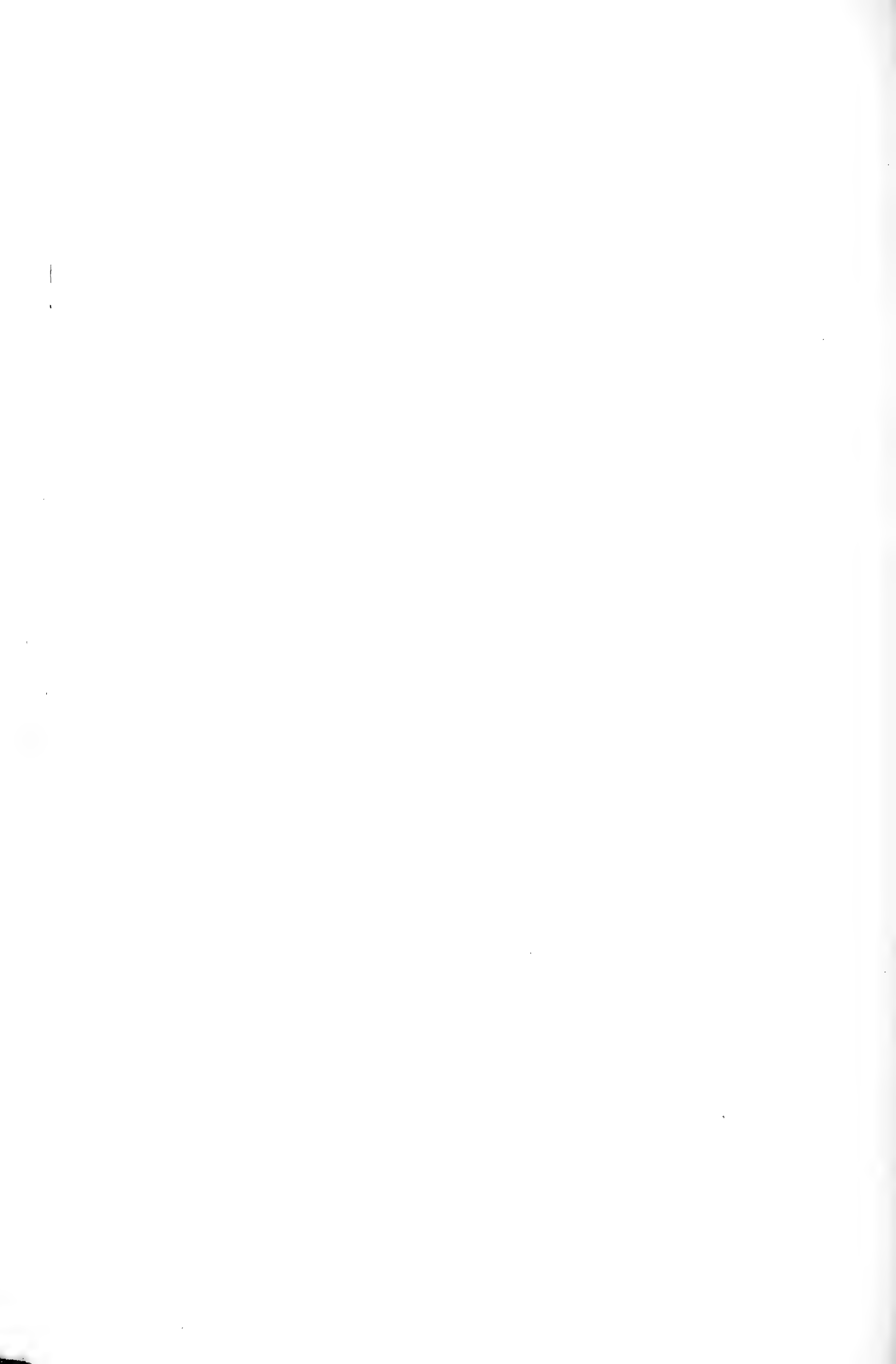
S. Ridge

Vicugna

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Aricoma, 15000', Depto. Puno, Peru.

9:15 the 7 grazed together in territory of A. I discovered the horseman resting near foot of S. Pasture. about 9:25 he left & rode toward S. Ponds area. 9:35, the 7 still grazing; another 100' from them on rock prominence. Then eighth close to group, apparently herding them up canyon 100 yds. at 10:35 the group 7 was another 100 yds. westward, 2 prone, others grazing. By 10:55, the 7 had moved 200 yds. down canyon, to near where A rested one moonlight evening. By 11 a.m., 2 prone. One prone opened mouth wide & closed it 2 sec. later, 3 X, at intervals 5-10 seconds, muzzle not raised as in usual yawn. Then it rose & grazed. all 7 have youngish look (check this) + 11:05, three prone. One ^{milled} ~~repose~~ hard at ribs while lying on side. Other milled feebly, extended on ground, or lay prone. Two more down by 11:08. Occasionally head shaken or ^{one} ear waggled forward & backward rapidly. Those down chew cuds, S fashion . 11:15, a 6th. prone, left wrist down first. All 7 down by 11:25; one with neck outstretched & chin on ground, eyes half-closed, ears back . Another lay on side, neck & head on ground. One prone with ^{doubled} wrists protruding in front of body, side by side. First to lie down was 25 yds. up canyon from the others. By 11:45, no change. I left & returned 12:25. The 7 were 50 yds. further down canyon (E.), all grazing. 12:42, 1 lay prone. 1 defecated. Possibly these all young or or. 12:58, prone one up & joined others grazing. By 1:05, they moved 100 yds. down canyon in a group, no leader apparent, to about 75 yds. W. of Rock Shelter. I went to shelter (1:15). The 7 still grazing 75 yds. away at 1:30. 1:35, a group of 4 appeared 300 yds.



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up the canyon where the 7 had first commenced to graze (A returning?). One slowly ran to 150 yds. from the 7. The 7 slowly walked to S. over a low ridge, one preceding others by 75 yds. Of the 4, rear one stopped to defecate; another rolled; then all joined the nearest (to 7 + one) + grazed (1:44), 150 yds. W. of Rock Shelter. The 4 gradually worked up canyon; 250 yds. away by 2:15. About 300 yds. up canyon from the ~~the~~ ⁷ group of ~~the 4~~ ^(the 4), grazing, came into view (2:16). One of rear 4 rolled in grass. 2:28, one of 4 prone. 2:40, at least 2 of the 7 prone. 2:45, down one of the 4 up. One of 4 defecated. By 3 p.m., at least 4 of 7 prone. 3:05, group of 5 (B?) ^{noted} appeared on S. side crest of S. Ridge, near where B has spent some nights. A single one from that direction came prancing toward the 4 tail up. It stopped 50' from the 4 as tail-up ♂(?) came toward it. Then it joined the 4 without opposition (the fifth of A which left the morning?). 3:12, closer inspection showed now 10 in the 7 group, one prone. B group descended slope slowly & by 3:15 was near foot - usual afternoon feeding area. Group B grazed diligently. Much grazing at surface of Distichia mat - must be ^{the} ~~the~~ very short fringe. Watched A. One prone 5 minutes 3:20, another prone 3:30, but up a minute later. all walked quickly 50 yds. down canyon to small pools water on mat. at least 2 drank. One kept muzzle in water for periods 12, 5, & 5 seconds, head up for about 5 seconds between drinks (pool 6" x 12"). Another drank in pool 2' wide. One rolled in dust 10' from pools, then remained prone there for 3 minutes. Check revealed 12 now in the group 300 yds. up canyon from A (4 prone). 3:35, two



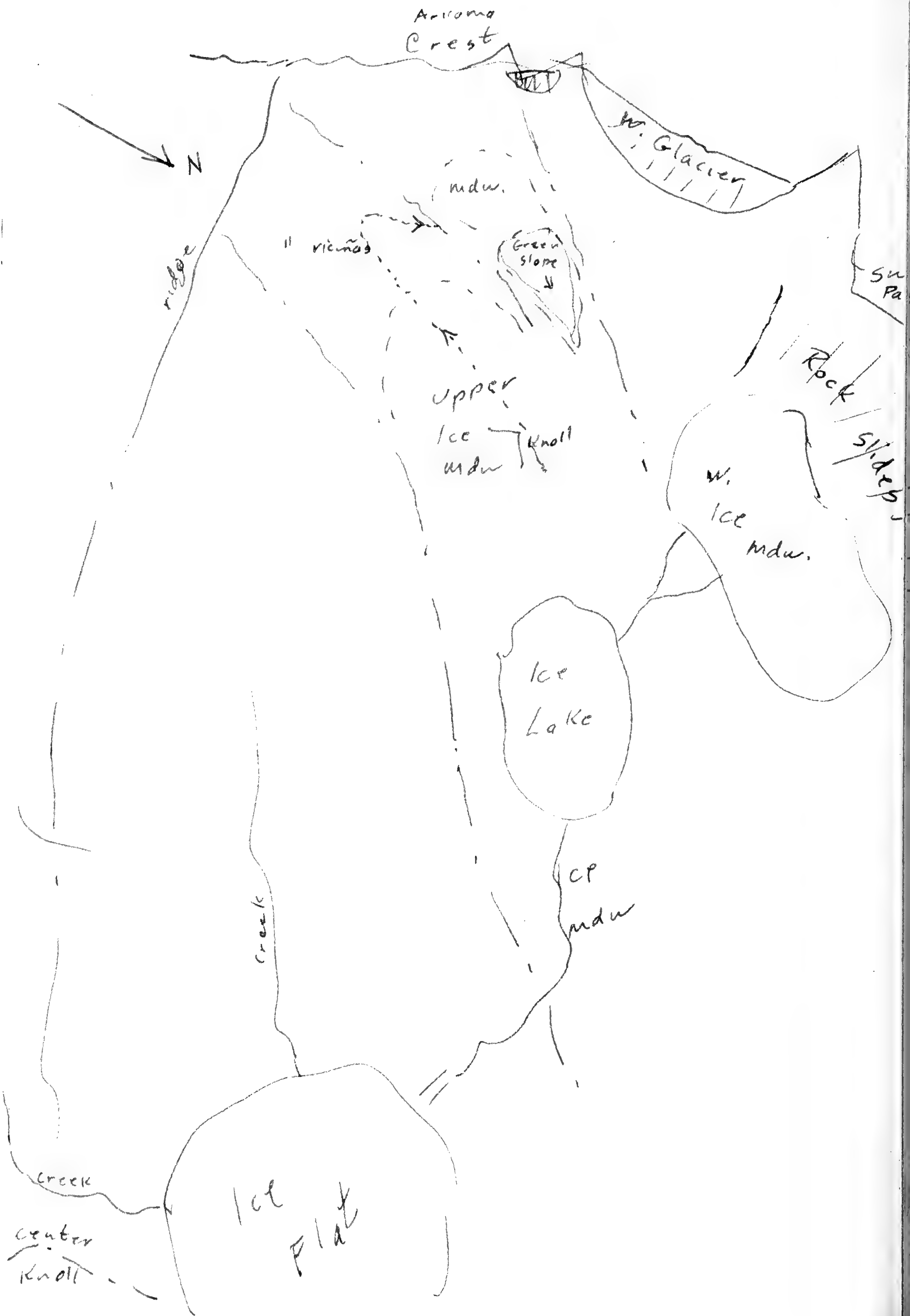
Vicugna

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Anicoma, 15000', Depto. Puno, Peru

of A rolled in small dust bauls - made from drying of pads in the green mat. Hind feet kicked back hard & simultaneously in the rolling. Then both up & group walked toward brow of hill (near Rock Shelter) in grazing, as if to descend to lower level near B. 3:45, one of A prone. Then one (♂?) of A went up canyon 400± yds. & stood near (chased?) the 12. 3:59, it ran down canyon to its group. One of them stood facing approaching one, its tail up. All ran 50' from the ♂(?) as it jumped a stone wall; then it rolled in dust. 4:02, all group A down over brow of hill toward House. The 12 had moved 100 yds. westward; at 4:10 a ♂ was herding them back from W. side. About 200 yds. beyond group were 4 (♀♀ of the ♂ probably). I returned to House. Group A grazing 50 yds. to NW, as usual in late afternoon; same 5 p.m. B was 100 yds. N. ^{of} House, also as usual in late p.m. ♂ of A nard feces pile, threw head up in "wolf howl," repeated, then defecated. 5:35, sun setting on highest ridge. Groups about as before.

July 28, 1951. At 5:55, one, ^{perhaps} ~~apparently~~ ♂ chasing a group, went across draw just NW of Rock Shelter & on over S. Ridge. Group A not found. Group B near crest of S. Ridge, 1/4 mile N. of Rock Shelter. Mary watched B 6 to 7 a.m. At 7:20 I saw all 5 of B down prone or on side - same to 7:35 - within 100' of where seen at 5:55 a.m. I walked up canyon, to W. 7:45, about 15 in group in center of east half of S. Pasture. Evidently the large group (12) had moved there, about 600 yds. ^{S. of} from where seen them last last evening. A group of at least 4 at head _(W. end) of the long meadow where 4x



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B usually grazed. 5 about 1/4 mile up draw leading SW from Ice Flat. Two at NW side of Ice Lake + 3 (or 4) including 1 young (?) at SW end lake. On upper Ice Mdw. where formerly group of 12 (2 being young of year), now 11 (2 young). These first seen near a low rocky knoll in center of meadow, where they have been seen before by me. At 9 a.m. I could see all 11 from about 600 yds. down canyon. My movements, even half hidden by rocks, seemed to disturb them + several stood facing me. I sneaked behind rocks to get closer. At 9:25, when I thought I was in good position, the entire bunch was 500 yards up their canyon, 100' vertically higher than before, + they ascended higher as I watched. I walked away to prevent further disturbance. They angled up a black rock ridge another 300' in elevation + crossed this ridge, whole group together, ^{to} onto a high flat on other side. This group speedily ^{disappeared} away. I returned down canyon. The 5 SW of Ice ^{Flat} Mdw. gave a squeal at me at 400 yds., same level. Disturbed 2 ~~at~~ near Ice Falls; these went to SW up canyon. Group of 5 near head of Long Mdw. At 10:50, back at Rock Shelter. Group A not evident. Group B, 3 prone, was high on grassy slope 200 yds. NW; a squeal at me but none rose. Three were up grazing at 11:12. Another rose about 11:20. 11:26, one climbed 30' above the others + lay prone. Both prone ones up at 11:40. Upper one again lay prone. About 500 yds. up to SW along foot of S. Hill, a group of 5 grazed (A?). Second prone 11:57, third at 12:03. 12:07, the upper prone one (or prob.) started down crest of



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Peru:
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the ridge as a group of 5 came up the ridge. Tail arched, ♂ stood 30' from 5 as they walked past, 50 yds. uphill from the B ♀♀. The 5 stood uphill from B ♀♀, + B ♂ below them - same at 12:15 with no attacking. One B ♀ rose but soon another prone. One of upper 5 prone & others, + B ♂, occasionally grazed. By 12:20, 3 of upper 5 prone. 12:27, a 4th prone. The B ♂ & the other one up (♂) walked back & forth, parallel & together, several times, back with tail sometimes slightly out from rump. ||, ears usually back on the foreign one. at times both grazed. Same at 12:35 (3 of 4 B ♀♀ then down & at same site as before). Then all B ♀♀ down. 12:40, B descended across slope 50 yds. to fecal piles & defecated, then ran toward its ♀♀ (1 up). Upper 5 had risen & started down slope 50' from ♀♀. B ♂ charged, tail high, but stopped when 5 were 50 yds. from ♀♀ (+ in + territory). The 5 stopped there. A B ♀ defec. + urinate. B ♂ trotted to the pile, nosed & gave half hump twice. At least 2 other ♀ defec. + urinate on one of 2 piles 6 yds. apart. One defec., turn & more pile, tread forefeet xx, then turn + urinate. Another B ♀ defec. + urinate, feet || in rear view. 12:48, one B ♀ prone. The two groups graze 50 yds. apart, B ♂ almost to other group (30 yds.). || left & returned 1:25. Brown about as before, all A up + grazing, B ♂ prone 100' NE of them, B ♀ 10-50 yds. NE of male. Two B ♀♀ rolled vigorously in dust; one remained prone there. 1:30, A moved to 100 yds. from B ♂ (still prone), & one (♂?) lay prone. 1:33, another A prone, & another B. 1:40, 4th of B down. By 1:49, 2 more of A prone (4). 1:51, all 5 of A down, 2 on side with neck on ground. 1:58, last of B



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down, + first to lay prone ^(or) up. 2:00, one of A rose + grazed.
 2:03, another B standing. 2:06, third one of B up. 2:07, second of
 A up. 2:15, still 3A + 2B down. // Left. At 4 p.m., group
 B on flat at W. side of S. Ponds, all 5 grazing. Group A
 was 150 yds. W. of Rock Shelter, all 5 grazing. Single one
 at S. edge of S. Ponds grazing at edge of a dry ^{pond.} lake. 4:30,
 one of A prone. Whistle from the lone one - a black dog heading
 SW toward Hume 300 yds. from it. Bot stayed 100' toward
 dog from its ♀♀ as dog passed 100 yds. away, + whole
 group moved 50 yds. up to foot of slope (S. side S. Ridge).
 4:41, prone one of A up; one B prone. I believe less time spent
 down after 3 p.m. than earlier in day. Dog went slowly over
 S. Ridge. B paralleled it 300 yds. away for 100 yds., + once
 one (or?) gave call  ^{high}, then. A lone one noted
 100 yds. NW of me. It walked toward dog + looked. after dog
 gone, lone one ran to 30 yds. from A, then to 10 yds., ^{and stood} stiffly. One of A came up to the adult ^[♀ joining] stranger - latter turned
 + faced away, neck stretched vertically, ears back, tail half
 raised, or other part rose 5' from tail. Then the member of
 A retreated + grazed, + stranger too. Another, young ♀, ran
 several steps toward stranger - + it away several steps +
 stood stiffly while inspected from a few feet to rear.
 Possibly it spit. Seems to be a ♀ but not sure. Then the
 stranger grazed peacefully as one of the group (5 p.m.).
 5:05, B had descended 100 yds. to foot slope again. The lone
 one still at edge dry pond. Sunset at Rock Shelter (5:05).
 5:15, one of the young A ♀♀ chased the larger stranger a few

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steps; then several yards, & ended by mounting it from rear, one facing on each side of hips. The stranger spat & ran out from under. Sometimes tail of stranger arched, 5:22, ^{one} it ran up the canyon, ^{a followed} chased by all of A (at least 1 tail up) for 100 yds. ^(the A or ?) Soon it appeared near a group of 5 about 400 yds. up the canyon, & it chased them down the slope. A went back to grazing as soon as they stopped ^{following the one leaving.} 5:45, B as before, but 1 prone (sleep there?).

July 29, 1951. 6:05 a.m., wind down canyon; -2° C. minimum last night. B ⁽⁵⁾ was 1/3 way up S. side S. ridge, near where last seen grazing last evening, 1 ⁽⁶⁾ still prone (6:05). A was 300 yds. W. of Rock Shelter, spread 50 yds., 1 up as I entered Rock Shelter. 6:15, 2 of B down & 2 of A up. 6:20, all A down about 10 yds. apart. 6:21, one of B up (other ^{prone} prob. or, on higher point). 6:30, rain hit both groups; 2 of A soon rose, then another (6:31). One of A rose & squealed toward me (the stranger?) - all but 1 of A up by 6:32, last up 6:35. One of A (stranger?), tail arched, neck verted, ears back, stalked near other & was chased 5± steps by one which then turned away quickly. Twice the chased one started to defecate but quickly walked from pile after letting a few pellets fall. 6:45, B same; group 100 yds. SW of where at 6:05. 6:52, abt one of A prone. 7:09, all B grazing. // I to House & back at 7:40. Still windy. A 50 yds. further up canyon, 1 prone. One A defec, then raised rille & gave wolf howl (or prob.). Second A prone. B was near brow of hill 100 yds. from Rock Shelter, or (2) 100' uphill from rest. Upper one faced me & squealed as I entered shelter; others looked a few seconds, then grazed. Upper one prone soon at brow

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of hill. These groups now used to me + little alarmed by normal approach. 7:53, group B filed 100 yds. to the green sloping mat 150 yds. NW of me, usual area for B. One of A rose, + walked 50 yds. toward B + 1 100 yds. Leading one ~~approached~~ ad. ♂. The stranger walked slowly toward ♂, tail arched, ears + head high. ♂ moved away when stranger 5 yds. behind. The other 4 of A all prone 8 a.m., + 1 of B. 8:03, the rear 4 of A walked up to leading one. Stranger held tail out. when others approached from rear. 8:07, all B up, ♂ of A, closest one to B (100 yds.), prone. 8:12, A ♂ rose + ran toward B. B ♂ ran toward it, ~~then uphill~~ and A ♂ stopped 20 yds. from B ♂. B ♂ ran uphill 100 ft. to feces pile + defecated briefly, then ran to 20' from A ♂, + A ♂ ran back 10' at B ♂. The two stood facing away from each other, 5 yds. apart, tails arched. Soon grazed. This occurred at territorial boundary, neither crossing line. 8:17, A ♂ walked back toward its group. all " up + grazing. The stranger 4 ♀ grazed 30 yds. from others. One it stood facing them with tail up and head high. A grazes on green mat slope. B joined ♀ on short dry grass slope uphill from green mat. 8:26, 2 B down. One first on side, neck up, 4 min. later lay neck + head on ground in front of body. All B down (4 on side, neck on ground) by 8:28. all A grazes. One on side, head sideways on ground, waggled ear forward + backward 5x rapidly. 8:35, all of B on side with neck on ground - no sentry - but 2 of the 5 prone 3 min. later. 8:40, odd ♀ of A descend slope 100' at fast walk, ^{rolled, walked,} nose pale, defec. + urinate. Definite ♀. Squatted further for urination. Urine stream pulsated irregularly. It then grazed 50 yds. from others. This individual pale with especially black muzzle markings.

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so usually distinguishable. One grazing, muzzle to ground 15-30 sec., then head up above back level 3-5 sec. or up to body.

8:55, ♂ of B up + grazing (down since 8:26). A ♂ came to 100' from B group; 2 more rose. ^{of} A ♀♀, 75 yds. from ♂, one prone. Odd ♀ was 100 yds. from rest. 9 a.m., A ♂ defecated, then walked back toward its ♀♀. Two B still down as before. Odd A ♀ defec. again - pile 150' from previous one. 9:05, ^{last} only 1 of B ^{rose} still down (max. time down was 37 minutes).

9:08, the A + B ♂♂ 5 yds. apart on opposite sides boundary; head single frog-like urly - the two stood quartering, tails up. 9:11, odd A ♀ held tail, neck, + head high as A ♂, 100 yds. away, walked 50' toward it (+ away from B ♂). A ♂ defec. (not either of piles used by odd ♀). 9:13, one A (different one) down, adult ♀, among low boulders. 9:16, B ♂ prone (rt. wrist down first), halfway between B + A ♀♀ (50 yds. from each). Odd ^A ♀ remains 100' from others.


9:28, a B ♀ prone; ♂ + ad. ♀ of A still prone. 9:33, B ♂ up (down 17 minutes), + the B ♀; A ♀ up 1 minute later. An A ♀ defec. + urinates, where A ♂ did earlier. B ♂ starts down hill to E., ♀♀ following. B ♂ stops at brow hill, then lies prone. A group moves 75 yds. E. Odd A ♀ approaches them, tail out, head high. 9:42, an A ♀ defec. + urinates. A group, ♂ ahead, only 75 yds. from prone B ♂ - A leader prone 9:44. Another A ♀ def. + ur., same pile. 9:48, a ♀ of B defec. + urin., same pile; noses, shakes head, turns, drops 2 more pellets. Another then moves to pile + defec. 1 blob (9:50).

9:53, a second down in each group. 9:55, only 1 B visible up + 2 down (other 2?). 10:00, B ♂ up (1 down, 3 up, 1?). Third A prone. 10:03, B ♂ defec. + urinates on pile 50' from that used by ♀♀. 10:05, 4 A ~~are~~ down. B ♂ grazes 50 yds. down slope from

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where lay. Breaze dies & gradually. 10:13, 2 of B walk down slope toward 07. Second to lie down (21 min. down) rises & follows, lost ³ over brow of hill 10:15. 10:15, 5 of the 6 A down. B group slowly descended to lower slopes 100 yds. downhill to NE. of rock shelter (out of sight). The remaining A & F up, adult, took drink at pool in wet; at least 3x & muzzle down 5 sec. +. Head shaken after raised, & jaws moved end-to-end in chewing fashion but perhaps with mouth closed (check this). No attention paid to Dreica finches close by on ground. 10:24, A 07, down 40 minutes, rose & grazed. By 10:26, 3rd of A up. 10:30, a fourth A up; 10:31, 5th. All A up 10:34. They spread 50 yds. SW up canyon. One young ♀ rolls on short dry grass, then grazes while prone; another roll & up. 10:38, young ♀ rolled on grass, thrashed 4x in succession, then lay on side with neck on ground. 10:40, it rolled to prone, yawned. Up by 10:43. 10:44, 07 rolled on dry short grass slope, turned over dorsally, lay on side with neck on ground 1 minute, rose. A ♀ moved 2 feet piles, tail arched, but did nothing. 07 then moved one of same piles & twice gave wolf howl. Again, a minute later. Walked feet on pile. Defec. & urinated. While tail out , it thrashed up & down at rate of 10 beats/4 seconds (= 150/minute; heart rate?). Two A prone by 10:50. Warm, clear, calm. 10:54, a 3rd. down but up again, walk 10', roll on grass, remain prone. 11:09, one rolled in dust bowl next to boulder, rose, shake head, resumed grazing. 11:05, 1 prone rose (down 15 minutes) & grazed. 11:13, 5th of A up (down 18 minutes). 11:15, one walk 30' to dust bowl, put nose to it, lie prone (rt. wrist first), rolls ^{down} on side, then remain prone. Last of former prone rises (26 min.).

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Groups working up canyon, 10-15 yds. apart. || I left + returned 12 M. Group B (2 down) 50 yds. from crest S. Ridge, 100 yds. uphill from where at 6 a.m. Group A 100 yds. further up canyon, to SW, all up + grazing. A ♂ climbed atop 2' high boulder. Adjacent ♀ ran 3± steps, tail arched. ♂ + another seemed to be looking at something up canyon. One of A prone 12:05; 3 B prone by then. By 12:10, 4 B prone. One A up, one down then up in 1 minute; 12:12, all A up. 12:15, last of B down; 3 of A down. || I left. 12:25, single one near dry pond at S. end S. Ponds. 2:20, group A, 6, 150 yds. ~~N~~ N of House, one chasing a 7th (the lone one?). Then A walked up canyon to 50 yds. NW of House. 2:30, group B, 5, appeared 100 yds. N. of House - usual area for both groups. These 2 groups gone from near house at 4 p.m. 3:30, saw 2 adults with young on slope below foot S. Pasture ^{near} where Ice Creek. 4 p.m., single one at S. end S. Ponds squealed at me, 400 yds. away. This may have caused A+B to leave House area. 5:30 p.m., group A, 6, 100 yds. W. of Rock shelter, + group B at foot of slope, 300 yds. NE of R.S.

July 30, 1951. 6:05 a.m., group A 250 yds. W. of Rock shelter, on gentle slope of draw bottom, 4 of 6 standing. One rubbed neck on ground. Group B was 100 yds. from crest of S. Ridge on moderate slope, 1/4 mile N. of Rock shelter, among scattered small boulders on grass; 2 were up. 6:10, all of both groups up + grazing. 6:12, 1 B down. B ♂ went 100 yds. E. of others. ^{6:05-} By 6:13, at least 2 B + 1 A had defecated. 1 A prone, then soon up. 6:18, 2 B down. 6:19, B ♂ walked + ran to crest of ridge above ♀♀; stood - then on own

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ridge. 6:20, 1 A prone. 1 of A, tail up, chased the odd ♀ (larger), several steps. ♀ came back & away. One rubbed neck on grass, hind feet driving forward. 6:25, B ♂ on ridge further W, again went over. 3 A ♀♀ in turn defecated same site. 6:28, one of ^BA ♀♀ went to crest S. ridge in direction of, & (6:32) it also over ridge. Group A had moved 100 yds. SW from 6:05 site, gradually. Sunrise at Lake Titicaca 6:32. 6:35, B ♂ returned to top ridge & stood on rocks, 100 yds. from 3 B ♀♀. Another (^{prob. not} 4th B ♀?) was 100 yds. E. along ridge; it prone 6:43. 6:45, a small young of year, tail vertical, neck high & head pulled back , came up to the ♀ on ridge; it rose. The two stood 6' apart, then ♀ grazed. B ♂ went back over ridge. ♀ on ridge walked over ridge away from young & it ~~soon~~ ^{followed} a minute later. 6:50, a group of 7 (all ♂?) filed over crest of S. ridge & along contour below middle Indian Marker, above upper range of B. B ♂ followed 50 yds. behind them. B ♂ stood on rock, often looking down toward its 3 ♀♀ (300 yds.). There ♀♀ walked & ran 100 yds. up canyon toward their higher pasture. 6:59, B ♂ ran down slope, stopped after 50 yds. to defecate, then on to 50 yds. from 3 ♀♀, stopped & grazed. The A ♂ had gone 200 yds. across draw & up slope to below the 7 which were proceeding S. along slope downhill. A ♂ approached group slowly, tail up. One met it, nose out, tail up. A ♀ jumped toward it. 7:05, the 7 went on up canyon at a run, pursued by A ♂. Another - an A ♀? - stood near.

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~~Arrioma~~ 1951.

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A ♂ approached it - a feat by each followed by A turning back + kicking up both heels. The 7 then ran up to the 2. A ♂ chased one down the slope to 2; others scattered + followed. ^{One actual contact, facing, head to each other, flank on if to bite.} Group B still only 4 (7:10 a.m.) //

I left. 8:15, B (5) on green mat slope of western + upper part territory, A (6) 100 yds. up canyon. Atop S. Ridge, invisible to B, were 4 including 1 small young (the 6:45 one probably). Went to Limbani + back. 4:30, group A, 6, 50 yds. N. of House; group B, 4, 100 yds. N. of House; lone one 150 yds. E. of House. Lone one + B squealed; Indian woman with 3 ~~llamas~~ llamas came down the draw where A + B usually feed. Then morning about 9 a.m. saw 6, including 1 young of year, inside Loop of road (formerly 7? - same group as has been seen in N. Canyon?).

July 31, 1951. Many ^{watched} ~~watched~~ A + B 6:15 - 7:15 a.m. Drove 5 miles toward Limbani + back. at 4:30, the 4 of group B about 150 yds. N. of House; 5 p.m., on flat about 300 yds. N. House. Group A, 6, came to usual area 50 yds. NW of House between 4:30 + 5 p.m.

August 1, 1951. Wind down canyon; clear sky; 0°C. at 6 a.m. 6:10 a.m., at Rock Shelter. B ^{♀ ♀} 200 yds. N. on high slopes of S. Ridge, ♂ 200 yds east of ♀♀. A not found. 1 B down ^{at} 6:10 but up 6:12. Lone one 200 yds. E. of House. 6:22, youngest B prone chewing cud. 6:27, an ad. ♀ B prone. 6:28, B ♂ prone. 6:29, sun hit B group, prone ones facing it - no reaction. 6:35, the 2 B ^{♀ ♀} up. 6:37, B ♂ up, walked slowly 100' uphill, lay prone 6:41. Up 6:44, walk 50', prone again. Lying prone, right wrist down



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first; wrists seemed to be slid forward on ground or ~~at~~ elbows bent. Position assumed slowly. 6:52, ♂ up. Rubbed knee, leg off ground and out \. B♂ walked 50 yds. toward ♀♀, grazed 100 yds. E. of ♀♀. // I left 7 a.m. at 8:30, all 4 B's where ♀♀ last seen. Still windy. A's not apparent. Drove down road to traps & returned 11:15. A group, 6, then 50 yds. NW of House. As drove to House, A walked over ridge to NW. At 1:30, noted A again 50 yds. NW of House. 3:45, A retraced over ridge to NW thru a break in rock wall; group B was 100 yds. down slope to E. of them. 4:20, I went to Rock Shelter. Group A (5) 200 yds. to W. Group B (3) at foot of slope, 200 yds. to NE, & one (B♂) 200 yds. W. of the 3, prone on slope in area where B often sleeps. Lone one 150 yds. E. of House, & 4 about 400 yds. down slope toward SE; Canyon (to SE) from that one. By 4:35, the B♂ (?) on slope had rolled, defecated, & walked 50 yds. across slope (to E.), somewhat nearer the 3 at foot hill. ♂ lay prone; the 3 ♀♀ below came 50 yds. closer, to 50+ yds. from ♂. A still grazes (4:45). One of A walked near another & latter put ears back & turned head away. 4:50, A walked 50 yds. further up the draw. One lay prone. all A in shade. Prone one rolled, then up. Another defecated. By 4:55, B ♀♀ higher on slope than prone ♂, 100' from them. 4:59, A 5 all ran 20 yds. toward me, apparently having seen me moving about. ^{grazing, minute later} Then I noted a group of 31 at foot of rock slide 300 yds. beyond A, & one (A♂!) returning from ^{big} group. ♂ grazed 50' from A. The other 5 walked slowly up to it. A ♂ rolled (defecated on way back to group). Several of 31 descended rocks to 200 yds. up canyon from A. A ♂ went 100 yds. up canyon from the 5 & stood. Apparently I had arrived (4:20) when

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A Bo was returning from chasing the big group. By 5:07, only 2 left at sunset at rock shelter, about 20 on rocks near

highest point where 31 had been, 3 + others scattered to S. down hill.
One apparent bellyrent or among largest group, chasing others.

3:10, the 4 B grazing same site, all up. 5:15, the big group scattered 200 yds. up on slope. Occasionally one chases a group but no actual con

lost seen. The 5 ♀♀ of A gray as before. Saw one still 200 yds. E. of House (5:20). The ~~apparent~~ A07 stood 300 yds. up canyon from its

♀♀. The remnant of big group, 24, descended to solid grass slopes.

5:25, B was 100 yds. E. along sidewalk from last site, & one (or?) was

100 yds. downhill from 3, walking down toward flat. 5:30, A & I walked

back to its own group; none stopped grazing to look at him.

5:32, Bell at foot hill in gentle slope (on flat of S. Pond). 5:45, the

big group all in a grassy draw below the rock slide. A ♂ went
up canyon 200+ yds. from ♀♀, tail out, as if to chase another.

60.m., B grazing as before. 6:10, limit of visibility, at least 2 B

still up, defecating. 6 p.m., 2 of A down ^{none very} on ~~very~~ gentle slope

200 yds. W. of Rock Shelter. 6:03 a third one. 6:10 - couldn't see if

any of A still up. Southern Cross visible 6:10 p.m.

August 2, 1951. 6 a.m., 1st Rod Shelter. A grouse not in sight.

Group B about 150 yds. N. of where last seen last evening, all were on

gentle dry short grass slope at 6. ft. of S. Ridge, $\frac{1}{2}$ 5 yds. apart, \rightarrow 20 yds.

up slope. 6:05, youngest stood, grazed. Others clear cut. $5/10$ thin cirrus

overcast; 1/10 alt's started to NE; no wind. 6:12, 07 up & grazing. 6:15, yearling
~~the number of birds was~~ young

prone + adult pup + grazing - 6:10, or defec. in pile 20' from ² prone ⁹⁹ 6:19

Have one grayling on E. edge of S. Pond flat. 6:21, one ~~frame~~ of 1 definite.

6:22, ^{last ad.} ~~at~~ prone 5 yds. from 2 prone ♀♀. Last ad. ♀ up, to nearby pile,


defec. & urinate ~~falls~~ (3 defec. all same pile). 6:25, youngest up



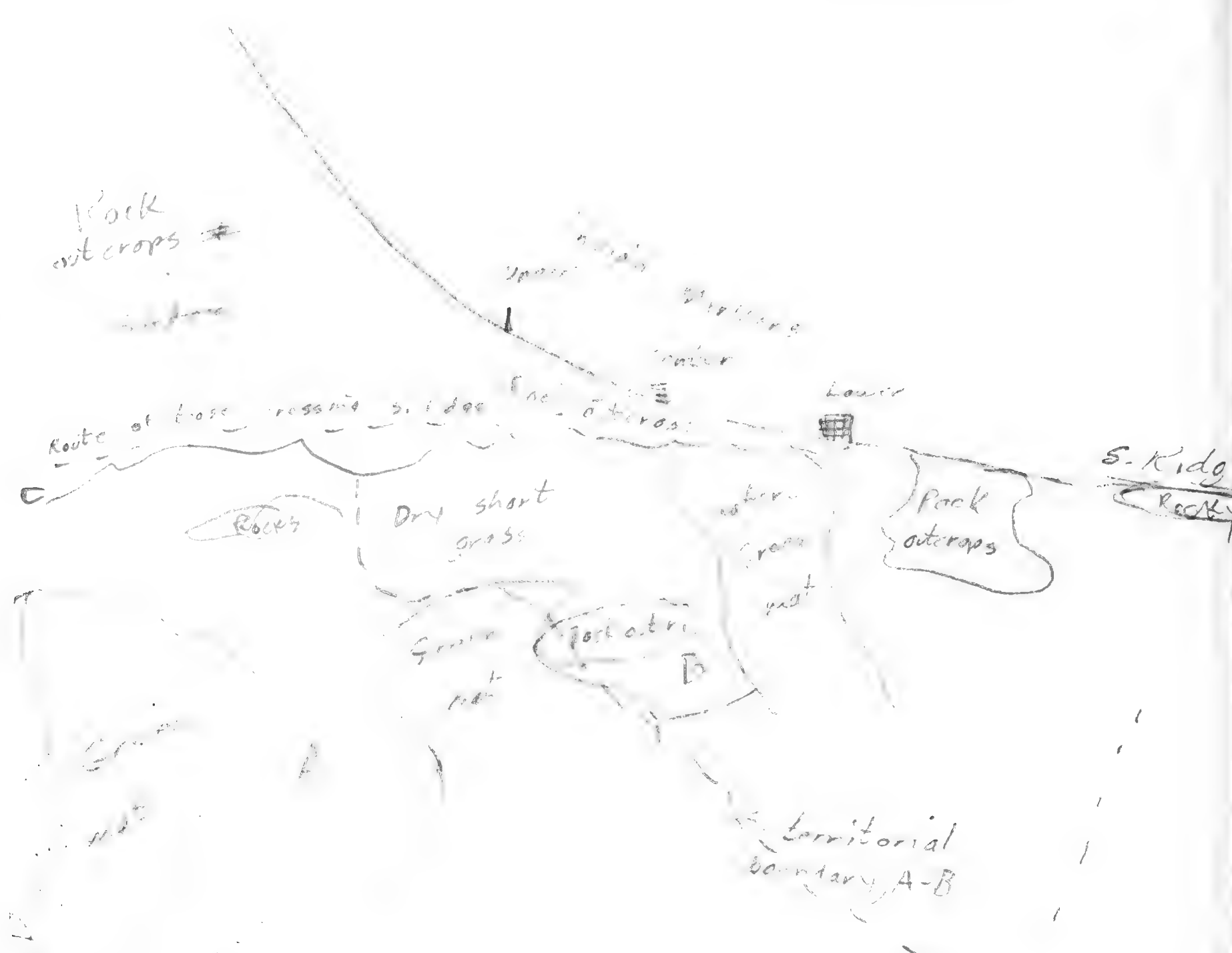
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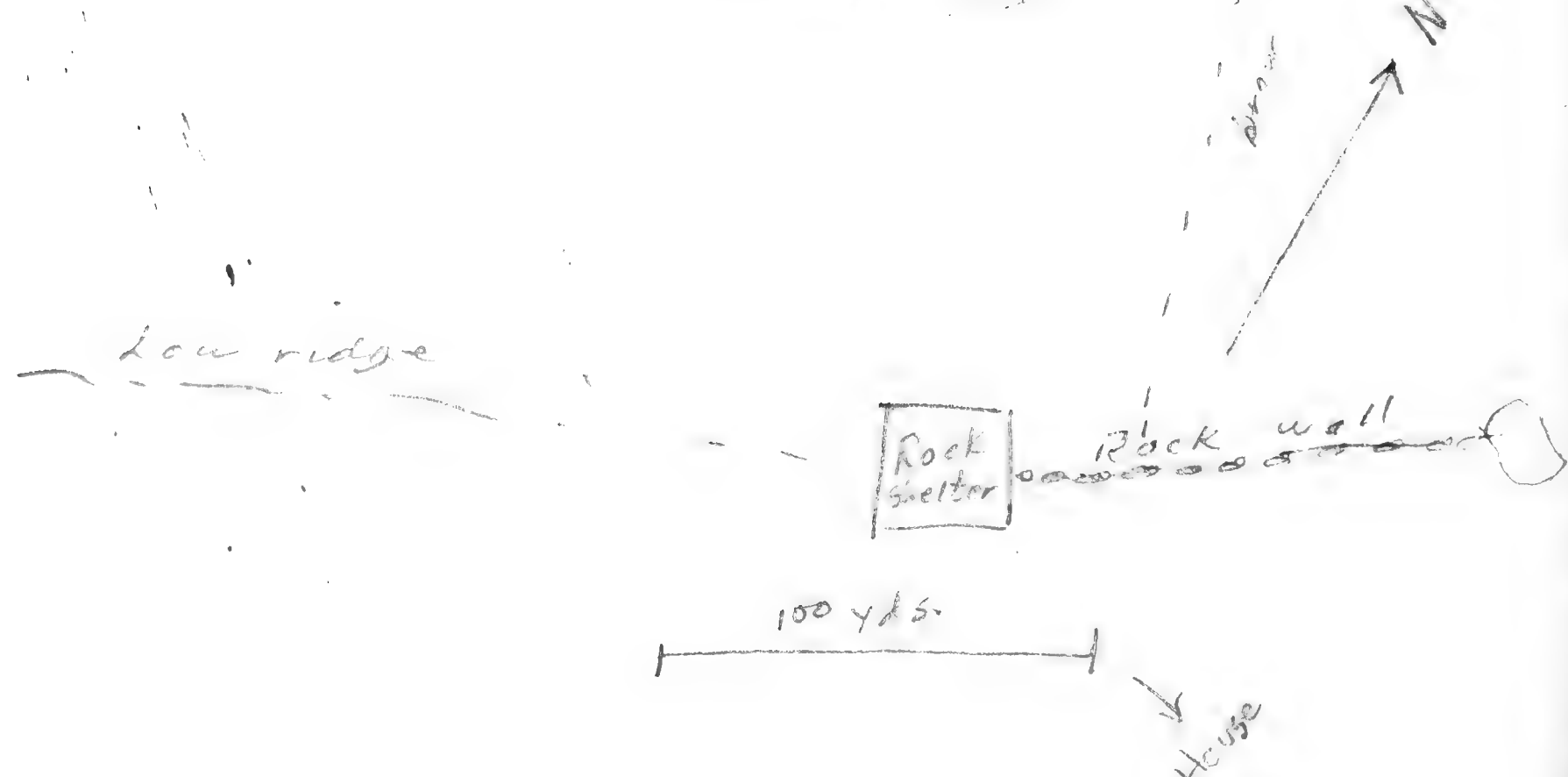
& defec., same pile. ^{one ad. ♀} Only [♂] now prone. 6:30, sunshine on B. 6:31, last prone up & walked to group. 6:38, ♂ prone 100' beyond ♀♀ & 20' higher. 6:41, ♂ stood, then walked, sometimes ran several steps, up & across slope to W., so 100 yds. up slope from ♀♀ at 6:45. At that time, 6 were above rock outcroppings below center Indian market - above usual upper territory of B, 500 yds. from B. Group A?, returning? - one walked from the 6 up canyon toward scattered 10 near draw where 20+ seen late last evening. 6:52, B ♂ defec. (tail pulses 132/minute). 7 a.m., 16 on lower rock slides where 10 were, & 5 100 yds. down slope. Presumed A ♂ is 200 yds. W. of its group, standing ^{100'} from leading 3 of the 16. These 3 ^{soon prone.} ~~prone~~ // Ad. ♀ prone 7:22, yearling ♂ 7:3. The A ♂ returned to its group without attacking approaching large group, & the 6 grazed together on A territory. 7:28, B ♂ prone (3 down of 4). The 6 group walked & ran to SW across draw together. Group of 5 in that area ran toward them the 6 running & stopped as if to watch. 7:32, B ♂ & one 2 ad. up. // Group 5 (including a young of year) approached along crest S. Ridge. ♂ 50 yds. to 50' from them & they retreated. As group neared post ♂, tail up & appressed to back  - higher & further forward than in adult. 7:35, yearling came up. // The retreating 5 (with young) descended S. Ridge to flat of N. end of S. Ponds. Another group of 5 walked toward them from direction of Pond. // 7:43, B ♂ prone, still at site 100 yds. from ♀♀ who had challenged approaching 5. // The 4 A's ascended sidehill of hill NE side S. Ponds & the 6 followed. One of 6 chased near 1 or 2 of the 5. Often in rear of the 5. Lone one stood at foot of the hill watching the action. Near draw where large group last evening, at least 7 visible; apparently none crossed slope to cross crest of S. Ridge. 7:50, 10 going W. along foot rock slides in that vicinity.

S. Hill



"Long meadow" -

← Bottom draw - 0 to 5% slope



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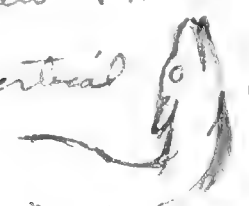
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ity. 8:06, B ♂ up. // The 4AIV grazed on W. slope of hill NE of S. Ponda. The 6 apparently crossed to NE near coral atop this hill. (rolled on way)
 8:09, B ♂ moved 100 yds. W. ♀♀ paralleled 50 yds. below. Ad. ♀ defec. ♂ walked toward crest S. ridge + ♀♀ followed. ♂ to crest + along it to W., 3 ♀♀ together 50 yds. down slope, following. 8:18, ♂ ran last 20 yds. to fence pile, defecated. ♀♀ 50 yds. behind. He grazed on slope of green mat of upper end of territory. ♀♀ walked past fence pile; one 1/2 m. past there. ♀♀ stopped where hickie of water in mat + all down - on outer fence E. on side of S. ridge. // The 4AIV disappeared from S. Pond hill, + a lone one, prob. usual one at S. Ponda, stood where they had been. The two ad. ♀♀ of B distinguishable in good light when near together, one darker with heavier head.
 Call them ^{D♀} dark + ^{L♀} light ♀. 8:28, ^{yearling} ♀♀ prone, others grazed. L♀ apparently drank again; no movement of neck or head from eyes back while drinking. // Group 4 grazing 1/4 mile up the draw (to SW), fifth near 10 at foot rockslide, 8 of the 10 prone (apparently the 10 chased E. again by 10 of 5). #12 prone on rockslide here then at 8:45. // 8:47, min. of B up + grazing. 8:50, B ♂ prone at top rock outcropping, 15' higher than ♀♀ grazing. 9:07, the L♀ prone on green mat. // Big group 500 yds. up canyon is now 15; 5 in group on green mat 200 yds. down slope to SE of them. // 9:17, both prone up (♂ + L♀); no apparent alarm. Dog barking 1 mile down canyon seems to cause occasional look in that direction. 9:30, B as before, 3 ♀♀ grazing on green mat + ♂ 15' higher level. 9:39, ♂ prone again on the higher level. ♀♀ walked gradually up slope of mat. 9:52, L♀ prone on bare ground cavity at edge grass. 9:59, D♀ rolled on dust ^{spot} ~~sub~~, stood, shook, then prone there. 10:01, L♀ up. 10:02, min. + L♀ rolled, + D♀. Then min. up + ♂ up, 2 ad. ♀♀ one on dusty area in grassy slope. Down, in rolling, first put head + neck to ground.

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forelegs not folded further than wrists, + rubbed head + neck. Then down in dust + gave 4 thrashes. Up, then down at edge where grassy ground breaks 1 ft. to dust haul floor, first head then side on this edge. Then prone 1/2 min. + up. Rolling evidently contagious. 10:18, imm. prone, D♀ up. ♂ had worked 50 yds. across slope, since rising, to 5 yds. uphill from ♀♀. 10:24, D♀ rolled on dust spot, then up + grazed. 10:28, ♂ walk quickly 50' down slope to fecal pile + defecate. 10:48, imm. up; scratched face, chin, + other parts with hind toe; then grazed. The 3 graze on dry short grass slope near. 10:52, D♀ defec + urin; different pile from that used by ♂. 11:00, ♂ walked to 2 fecal piles. Nosed first, tail arched. Same at second, the one last used by ♀, then threw head up in wolf haul. Haul repeated 4x after nosing pile; line of chin back of vertical . Then ♂ toward D♀; latter put down head + walked 3 quick steps. L♀ rose (11:01). 11:04, L♀ + imm. defec. + urinated on piles 10' apart, simultaneously. Then group walked down slope 100 yds. to green mat at lower level. All grazed diligently. Many watched. Once she saw the imm. + L♀ stand side by side, one putting head toward other + latter holding its head away as if to avoid a spit. The 2 reared up on hind legs + forelimbs struck together once. 11:32, D♀ prone. 11:50, I returned. 11:53, D♀ rolled, rose. Imm. rolled. All walked quickly 100 yds. NE over brow of hill leading down to S. bank. 11:55, one adult came, its back together but off ground 4". Imm. prone 12 M. The next gope - injured in clash? 12:12, D♀ L♀ defecated. 12:28, D♀ prone. 12:33, L♀ prone. 12:43, many to Rock shelter. ♂ rose + squealed, then walked 50' away. Then 3 ♀♀ up + all grazed. 1:03, ♂ prone among small boulders 100' from ♀♀. 1 p.m., lone one till at NE side flat of S. bank, now

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Aricoma, 15000', Dpto. Puno, Peru.

prone on bare spot of ground ^{near} at foot slope of S. Ponds Hill. D♀ prone 1:12. ♂ up 1:20. D♀ up 1:32. 1:35, ♂ to feces pile, defecate, turn 180° & no pile & walk forward on it, turn 180° & defecate ^{heavily}, then walk off & graze. 1:38, 1 rolled, then prone, then up. All went down ^{slope} to E. at foot edge, 3 steps/second, until near place where seen 6 a.m. 1:45, one prone there & other 3 grazed. Prone up 1:48. A few pieces hail fell. 1:50, one lay in dry small pond & rolled (or?), then out & grazed. 2:03, B♂ started off at slow gallop, head low, toward lone one 250 yds. away. B♂ stopped 50' from other; latter slowly walked away, tail never raised (B♂ tail arched at times). B♂ grazed & walked after other until 400 yds. E. of its 3 grazing ♀♀ & near NE side of S. Ponds. D♀ defec. 2:11. 2:12, B♂ runs, head low, to 50' from other, & stops, tail arched. 2:19, B♂ ran slowly 100 yds. away from other to feces pile & defecated, then started toward B♀♀. Thin whistling cry heard; ♀ then went 50 yds. toward ♂, rum. rolled in small dry pool bed, then remained prone there (2:22) - still prone 2:30. all 4 within 50' space 2:30. Total low overcast, cold. 3:05, L♀ walked 50' up slope, defec. & urinated. Solid low overcast. 3:15, B♂ walked 150 yds. across & up slope to 30 yds. above ♀♀; then defec. on 2 piles (same as used by last ♀). Then the ♀ toward rum. & both ♀ defecated - one on both same piles. ♂ walked further up & across slope. ♀♀, in group, trailed 50 yds. behind. 3:26, ♂ prone higher on slope than ♀♀. 3:33, L♀ rolled, then stayed prone. 3:55, ♂ up. L♀ still prone, chin on ground & neck outstretched in front of body. 3:58, all 4 ran down & across (to E.) slope 100 yds. & grazed on dry gentle slope near S. ft. of S. ridge. 4:12, led by ♂, group walked steadily toward House. ♂ stopped & defecated, ^{in all} then walked on. After 250 yds., ♂ stopped at foot ~~camp~~ draw below Long Mdw. & drank, 5X, 5-10 seconds each time, head up

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6 a.m. - 6 p.m.

Drum

<u>♂</u>	<u>D♀</u>	<u>L♀</u>	<u>Imm.</u>
<u>Prone</u>			
6 - 6:12	6-6:23	6-6:15	6 - 6:05
		6:22-6:31	6:15-6:25
6:38-6:41			
7:28-7:32	7:22-7:32		7:23-7:35
7:43-8:06			8:28-8:47
8:50-9:17		9:07-9:17	
9:39-10:02	9:59-10:18	9:52-10:01	
		10:02-11:01	10:18-10:48
	11:32-11:52		
11:55-12:43 ₀	12:28-12:43 ₀	12:33-12:43 ₀	12 - 12:43 ₀
1:03-1:28	1:12-1:32		2:22-2:35
3:26-3:55		3:33-3:58	
9X, 3-48 min, total 194 min. Ave. 22 min.	6X, 10-23 min. 107 m. 18 m.	7X, 9-59 137 20 m.	7X, 5-43 132 19 min.

Ar. ab. 20 min.
6-9X per 12 hrs.
♂ 1/2 more than ♀
Rave after 4 p.m.
2 a rest periods,
1 after 1 hr.
Max. period 1 hr.
Of only 2 a rest periods,
1 after 1 hr.

Defecate

6:16			
6:52	6:23	6:21	6:25
8:18			
10:28	10:52	11:04	11:04
1:35	2:11	12:12	3:20
2:19			
3:15	3:20	3:05	
4:15			
4:54		3:20	
9X in 10 h. 38 m.; Interval 36 m. to 3 h. 07 m. Ave. 1 h. 20 m.	4X in 8 h. 57 m. Int. 1 h. 9 m. - 4 h. 29 m. Ave. 2 h. 19 m.	5X, 8 h. 59 m. 15 m. - 4 h. 43 m. 2 h. 15 m.	5X, 8 h. 55 m. 4 h. 10 m. 4 h. 40 m. 4 h. 28 m.

Max. 4 1/2 hrs.
3-9X in 12 hrs.
♂ 2X as often as ♀
(Recalc. to 50 min.)

Roll

8:10

9:59
10:02
10:24
11:5210:02
3:3310:02
11:521:39
2:00
5:00
5:51Ave.
3X/day



Vicuna

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Aricoma, 15000', Depto. Puno, Peru.

Between drinks. Presumably second time. ^{imm.} male & bull; other 2 loped but slowly approached. Still low on ground. 4:30, snowing lightly but steadily. B still grazing ^{snoring ceased 4:45} diligently. 4:54, B & called 50 to pasture defecated. Now 50 yds. from ♀♀. 5:30, still grazing diligently & together. Low fog blowing up canyon often obscured vision. ♂ went 100 yds. toward House & back to group by 5:35 (to chase ^{some?} ~~some~~?). 5:40, ♂ ran 75 yds. up slope toward 4 (or +) near Rock Shelter. The 4 went up canyon. B & grazed where it had stopped. By 5:44 the ♀♀ had joined the ♂. Fog & breeze persists. Group ascended lower slopes below Rock Shelter. One called (5:50). Another called. Lost group in fog. Today watched continuously & recorded all ups & downs, defecation, & rollings. This info can be used for quantitative summary. Weather atypical.

August 3, 1951. Light snow on ground. 8:15, B grazing on its upper green pasture, apparent ♂ prone at higher level. A, 6, 150 yds. W. of Rock Shelter, prone; one squealed at me at Rock Shelter. 10:20, group of 26 on hill 200

~~August 3, 1951~~ yds. SW of House. 4:20, noted 6 of B about 200 yds. N. of House.

August 4, 1951. Clear, frosty, -6°C. at 6 a.m. 6:00, I at Rock Shelter. a group of 14 ran southwestward across upper territory of B, 4 leading (one yearling), then one with tail up (it turned & chased followers once), then 9, all now a line in file. Group moved up long ridge & out of sight. Group A, 6, 300 yds. W. of shelter. Presumed ♂ ran toward & stood near passing group; all of A up. Group B, 4, 100 yds. from crest of S. Ridge about 600 yds. NNE of Rock Shelter - 2 up by 6:20. 6:22, 5 of 6 in A group prone; one, ♂?, prone 50 yds.

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August 4, 1951

Aricoma, 15000', Dpto. Areo, Peru.

from rest of group. 6:28, all B up; saw some in this group. All 6 of A down prone, 5 within 5 yd. down. circle. 6:34, sunshine reached A. 1 B prone lent up ⁱⁿ 3rd min. 6:38, 3 crossed S. Ridge in B territory but 1/4 mile SW. of B (one stopped & defeated). B ♂ stood 100 yds. toward the 3 from its group. 6:40, 1 A up, then down again. 6:42, 2 A up & gaze; 6:43, 4 up; 6:44, all 6 of A grazing. B ♂ turned toward its ♀♀. // Drove to ^{the} ~~house~~ ^{house}. At 7:45, near road near lower section of Lake Aricoma, saw 7 at lake shore, 1 apparently drinking, & 5 on S. side road, 200 yds. from other bunch. Two one apparent ♂ from each group met at road, tails up, & brief chase. Near outlet stream, group + 2 seen. Returning, about 2 p.m., halfway up from road junction to Lake Aricoma, saw 5 A 1 K in group. Near foot of Lake A. saw 7 (1 young), & 4 on ridge to S. In Loop of road near hut saw 6 (1 young) about 3:30. About 3:45, nearing House, saw A, 6, 50 yds. N. of House, & B, 4, 100 yds. N. They walked away as we came within 100 yds. of them, but 10 minutes later back at old site. 5:30, group A was 50 yds. E. of House - rarely seen there. About 5:15 p.m. had seen 4 in head of Basin below Lacumit under group of 10 (incl. 2 young) used to be seen in June.

August 5, 1951. About 8 a.m. a group of 7 or 8 on S. Ponds flat & in forenoon 8 about 200 yds. W. of House in usual B territory. One crossed to E. side S. Ponds to chase another. Possibly the 8 was B augmented. Mary has some notes on

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August 5, 1951

Aricoma, 15000', Dpto. Puno, Peru.

there. At 4 p.m., group A, 6, about 50 yds. NW of House, & group B, 4 still, 200 yds. N. of House, both as usual in mid-afternoon.

August 6, 1951. Two alpacas resting near Snow Rock Shelter at 6:20^{a.m.} when I arrived. Clear, cold. Group B, 4, 400 yds. N. of shelter, halfway up moderate slope of S. Ridge. Group A not evident. First of B up 6:31 when sunrise line a few yards from it. 6:36, 2 more B up. 6:38, all B up. One gave screeching call toward me & alpacas. Then B group walked eastward along contour for 100 yds., & ♂ 100 yds. further on. 6:40, two appeared atop S. Ridge to NW of shelter. One called repeatedly toward me & alpacas, chit-chit-chit-chit-chit, the last sound diminishing in intensity & descending scale. The other gave much more whistling sound, 5 or 6 repeated in quick succession on descending scale, last 2 or 3 more drawn out & ^{less} diminishing in ^{intensity} ~~scale~~ & descending scale. 6:45, these 2 ran down S. Ridge to E. as if to peer at B, then went over crest of ridge to N. 6:50, B ♂ walk fast & straight 50 yds. eastward & defecated (first seen today). Apparently defecation not urgent upon morning rising; this suggests defecation at night (as one observed in moonlight). 7:15, group B together, 50 yds. further down slope toward flat of S. Ponds. At 8:30 a.m. I left to drive to Juliaca. Saw 4 (1 young) above road near waterfall in loop. Another 4 (1 young) just before summit of road. At 9 a.m. near the lower smaller section of Lake Orizoma (Outlet Lake 1/4 mile across) saw groups 4, 6, 2, & 4. Near outlet stream groups of 2 & 1,

Vicugna

August 6, 1951

Nr. Crucero, Depto. Puno, Peru

this stream barely running & have only occasional pools. About 1 mile beyond fast lake saw 1 near small lake (1 mile lake). On flat near Crucero paired & running parallel to road. They were running with heads higher than back level, apparently not top speed, & they gained on me at 20 mph. None seen from Crucero down. [at Juliusia found watch 10 minutes fast.]

August 8, 1947

Aricona, 15000', Depto. Puno, Peru

about 9:45 a.m. saw group C on S. side road near Outlet Lake. Inside Loops a group of 6. At 10:30 group of 4 (B) halfway down slope toward S. Ponds Flat from Long Mdw. At 3:45 p.m. group A, 6, 100 yds. NNE of House, & group B, 4, 300 yds. N. at edge S. Ponds Flat. 4:55, ^{at House} sunset. About 300 yds. SW of House on green damp mat area, 40± in bunch. Some seen 50 yds. NE of House - only, here in last week.

August 9, 1951 At 6:30 a.m., 4 (1 young) about 200 yds.

S. of House in green mat draw. As I appeared one gave ^{whistle} seerawing ~~twistle~~ & group walked away over ridge. From Rock Shelter I saw group B, 4, grazing halfway up S. slope of S. Ridge - usual area. Group A, 6, in Long Mdw. 250 yds. W. of Rock Shelter. Searching for them, encountered group of 9 (♂♂?) at head draw, 1/4 mile SW of House. These crossed to Long Meadow above Group A (7 a.m.), when disturbed by me. About 1/4 mile further up Long Mdw. at head, a group of 5 on gently sloping green mat. 8:25, I on S. Ridge to investigate group in Loops. The group of 6 grazed on greenish-brown gentle slope 1/4 mile W. of water-fall. Clear sky, light breeze up canyon. One lay prone. Group



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August 9, 1951.

Ariconia, 15000', Depto Puno, Peru.

was spread 50 yds. Prone one lay on side. Dropped side head dorsally along ground two strokes as if to scratch. Prone 2 \pm min. later. Grazing on green mat. 8:38, prone one up + all grazed. Apparently one young of year in this group. I am watching from about 700 yds. By 9:35, group had walked 50 yds. along slope + back. None had lain down. Then one, followed by young one who seemed to be trying to get head under abdomen to massage, headed southward 50+ yds. (out of sight behind low ridge), + all but one (50 yds. from group) followed. // I stalked to new position but when arrived (9:50) the 6 feeding over a low ridge 1/4 mile N. of last site + group of 7 llamas + 2 men about 1/4 mile from them coming down the llama trail which passed 100 yds. from feeding site. // I moved northward to edge N. Canyon the 6 had crossed floor (100 yds.) of N. Canyon + ascended steep rocky + grassy slope on N. side for 100 yds. All grazing 10:15 (possibly 1 or 2 prone earlier. Young one next to highest on slope. Protective coloring good against dry grass. 10:20, 5 ran 100' straight up slope; all 6 looked down slope - I saw nothing below (100 alpacas 1/2 mile down canyon). Within 2 minutes they resumed grazing, 1 still below others 100'. 10:35, youngster prone. Lowest on slope rolled, sliding a few feet downhill, then grazed. Occasionally grass stalks 6"-8" long seen to in mouths. 10:40³⁹ young one rose + grazed. 10:50, lowest had gradually worked up to others. Soon one walked 100' up slope to crest of ridge - others followed slowly + all grazed there. 11 a.m., group out of sight over ridge. I walked to Fox Lake + amphitheatre N. of it but could not relocate

Vicugna

August 9, 1951

Aricoma, 15000'; Opto. Puno

group. Returned to House. Haven't seen usual individual near S. Ponds today. || 1:50, group A 50 yds. N. of House & B 100 yds. N. House. || 2:50, returning from Ice Creek in jeep, encountered lone one 300 yds. SE of House. It retreated toward A. As A retreated (was 50 yds. E. of House; retreated from car?), lone one pruned toward it as if to give chase but did not continue. I drove down to S. Ponds to watch A & B. Both groups disturbed by this & started up & across slope toward foot of Long mdr. B ♂ walked 10' from A group, A adult (♂?) lone nearest it, while B ♀♀ continued on 100 yds. B ♂ faced A adult, ears up, while A ♂(?) faced away from it, ears back horizontal. Soon both belligerents grazing 5 yds. apart, B ♀♀ still separate (3:15). I parked 400 yds. NE of groups to watch. 3:20, B ♂ prone 50 yds. toward B ♀♀ from A. 3:33, B ♂ rose, walked 50 yds. to face pile dam hill from B ♀♀, defecated, then grazed nearby. An adult B ♀ lay prone. Group A, all within 30' distance, 100 yds. from B. 3:42, B ♂ up. One B walked quickly 50' down slope to edge mat. Others followed but 1 ad. ♀ prone before reaching mat. Other B's grazed. A working higher on slope toward Rock Shelter. 4:45, in turn, A jumped 2' rock wall starting jump from standstill, forefeet striking almost together. They passed across slope 100 yds. uphill from B & slowly continued on to foot of Long mdr. 4:50, the prone B ♀ rose & grazed with the others. Then one ran down slope toward B. B ♂ ran toward it. A group came 50' down hill. Newcomer stopped, A & B ♂♂ 50' on opposite sides of it. New one

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August 9, 1951

Aricoma, 15000', Depto. Puno, Peru.

with tail down; ♂♂ tails up. B♂, head lower than belly, started uphill towards stranger. Latter tried to run into A♀ but A♂ headed off several times & finally chased it fast uphill. The other A's soon walked slowly uphill too. B♂ grazed 50 yds. ^{uphill} from its ♀♀. 1/2 overcast & sun hidden now. 3:55 p.m. B♂ walked down slope to ♀♀. ♀♀ soon walked on ahead farther down slope onto green mat. D♀ 100' ahead of bunch. It looked about fruitfully & finally drank, 3 drinks, one 15 seconds long. B♂ again defecated. All B within 50' at 4:05. One scratched top head with hind foot, head low in front of body. By 4:30 B had moved ^{about 30} ~~only a few~~ yards to S., near 10' boulder where often seen in late afternoon. Grazing vigorous. By 5 p.m. group A (6) was grazing in draw just N. of House, 150 yds. uphill from B.

August 10, 1951 6:35 a.m., B ⁽⁴⁾ about where early yesterday morning. One prone; up 6:40. One (♂?) 100 yds. E. along contour from others. All 6 A up & grazing on green mat slope below Indian markers in usual territory 7 a.m., the lone one ^{at} NE side of S. Ponds. 8 a.m., B had moved westward 300± yds. & was 200 yds. NW of Rock Shelter (move there to drink in morning?), one (♂?) prone above rock outcroppings 100' uphill from others. Group A, 5 prone, at edge green mat 200 yds. SW of B, near where earlier. Calm, clear, warm. 11 a.m. when left for Limbanie, groups (the 40± ♂♂?) on rim 300 yds. SW of House.

August 11, 1951. About 12:30, returning in jeeps to House, saw groups A & B in usual areas, A

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August 11, 1951

Aricomá, 15000'; Depto. Puno, Peru.

50 yds. NW of House + B 100 yds. N. of House. Drove within 75 yds. of B + they walked away. About 5 p.m. group A was 50 yds. E. of House. When I appeared in open, then quickly walked 100 yds. NW toward slopes below Long Indur.

August 12, 1951. At noon group B on S. Ponds Flat 300 yds. N. of House. 2 p.m., group A, 6, 50 yds. NE of House. One prone for a time. 4 p.m., a vigorous chase took place 100 yds. E. of House. Apparently A ♂ chasing the lone ♂. Throaty low growls heard. Chase back & forth several times. Then ♂ join 5 A ♀♀ + this group moved off to NW (possibly saw us watching) + lone one about where seen when attack started. Since A started coming to E. of House in afternoon, often comes in contact with the lone one. 5:30 p.m., group B at edge S. Ponds Flat below foot of Long Indur. Group A 100 yds. W. of Rock Shelter, at least 1 prone. Lone one 400 yds. ESE of House.

August 13, 1951. Clear calm morning, $-5\frac{1}{2}^{\circ}\text{C}$. minimum last night.

A; only 4 in group this morning.
 # set out to watch group B. 5:50, all prone 75 yds. S. of crest S. Ridge, to N. of Rock Shelter, among small boulders. 5:54, ♂ up + grazed. Sometimes on peaks. 5:55 others chewed ends. 4 ♀ grazed prone, then (5:59) up + grazed. 6:04, one on upper part B territory 300 yds. W. of ^AB; ^AB ♂ walked slowly 100' toward (3 others 300 yds. ^{SS}W. of first + probably spent night there). 6:06, 50 yds. from ^A♀, B ♂ defec. then back to ♀♀. 3 from W. joined the 1; all 4 in hollow + perhaps not seen by ^AB ♂. 6:08, 4 ♀ prone near other 2 ♀♀. 6:10, D ♀ up + grazed. 6:11, 6 ♀ up; only min. down; all within 50' distance. Of the

D♀ + L♀ of A not surely distinguishable.

A ♂ less militant than B ♂.

Vicugna

August 13, 1951.

Ar. 10 mi. 9, 15000', Dpto. Puno, Per. J.

foreign 4, 3 grazed & 1 stood on rock rise looking toward ^{A.} B. 6:16, sun hit ^{A.} B; no reaction. 6:17, imm. up. 6:21, sunrise at rock shelter. 6:26, one of ^{A.} B gave whistling cry - toward me? Group slowly moved eastward across & down slope 50 yds., L ♀ leading. L ♀ stopped at pile, def. & urin. Then imm. d. & u. same pile. 6:29, D ♀ d. & u. same pile. 6:33, ^{A.} B d. & u. same pile. 6:43, D ♀ prone on slope, all 4 within 30' dist. 6:47, ♂ down on side but up in 1 min. 6:51, ♂ defec. - feces wet & not well formed into balls or pellets. 6:58, L ♀ down. 6:59, imm. prone, L. wrist first. All 3 ♀♀ prone in 10' drain. ♂ pushed neck along ground while standing on hind legs, forelegs doubled. 7:01, ^{A.} B prone 50' uphill from ♀♀. 7:06, ♂ up, then L ♀ up, then (7:08) all up. a group of 6 (1 young) crossing to E. 100 yds. uphill from ^{A.} B. ^{A.} B moves 50' toward them, strung out in file, but no aggression. The 6 passed down ^{slope} 100 yds. E. of ^{A.} B, one 50 yds. behind 5. Then to edge S. Pando Flat & graze. 7:13, D ♀ prone // all 4 of foreign 4 prone where before. In 6 group, 1, tail arched, approached to 6' of 2 in succession & apparently spit at. 7:20, lone one at S. end of S. Pando. // 7:22, D ♀ up quickly. 7:25, group 15 came over crest S. ridge to NNW of rock shelter, 150 yds. E. of foreign 4 & 250 yds. W. of ^{A.} B. 7:30, the 15 stopped & grazed; 1/3 lay prone. ^{A.} B midway between 6 & 15 & seemed to look toward both but no pursuit. // Foreign 4 still prone 6:40. The 6 moved SE across S.P. flat // 7:42, ^{A.} B moved 75 yds. W. & down slope. L ♀ & imm. defecated on one pile. // The 6 moved S. across face of S. Pando Hill chased vigorously by the lone ♂. 7:45, ♀ and ♂ beemule appeared near the foreign 4 - the 4 ^{had risen} up & moved 100 yds. W. The 4 stood 20' from the beemule, watching them intently. Finally beemule



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walked away along sidehill going up canyon to SW. They finally descended slope 50 yds. beyond group 15 ± vicuñas but no reaction seen. 11 Group ^AB moved toward House 200 yds. + at 7:55 was 200 yds. N. of House on green mat. 8:03, the 15 grazing (♂♂?) going down draw toward ^AB; 200 yds. away. Another 15 ± were 1/4 mile up Long Mdw. from me (♂♂?). 11 The foreign 4 went up canyon; the 15 ran toward them. all joined peacefully - the 4 were ♂♂?. 8:17, the near 15 only 50 yds. from ^AB + the ^AB ♂ stands looking at them. One of the 15 ran to ^AB ♀♀ - ^AB ♂ headed it off + vigorous chase commenced. all 15 ran to + mixed with the ^AB ♀♀. ^AB ♂ chased one + another vigorously but no actual contact. Throaty cries, grating, low, heard ~~as sound like~~. Chasing subsided about 8:25 + 3 ^AB ♀♀ were together on a slope above latter. 2 of the 15 walked away to S. past House + grazed. ^AB went across + up slope to foot of Long Mdw. + 8 of the 15 followed. 8 grazed 50 yds. from ^AB. 1 walked to 50' from ^AB + they stood facing; then the 1 rejoined its group. ^AB ♂ grazed (8:49) 8:54, 3 ^AB ♀♀ prone but up as ♂ off to chase a lone one approaching ^{from up Long Mdw.}; latter stood fast; ^AB ♂ stopped, + lone one followed ♂ to ^AB ♀♀. This lone one apparently a ♀ yearling - perhaps slightly younger than the B min. Saw 5 in ^AB. Same one from 8 moved toward ^AB after standing + watching them. ^AB ♂ chased it back. 8:59, one again toward ^AB + chased back. 9:04, ^AB ♂ defeated. Of the 8 ♂♂, 6 wandered E. along S. slopes of S. Ridge + 2 moved to 30 yds. uphill from ^AB (9:15). (Two others ~~went~~ went SW along slope near middle Indian marker). 9:17, D 4, then ♂ prone, ♂ 100' up slope from ♀♀. The two (of 8 ♂♂), min. appear

Bo

Passively watched B before 7:55 +
A afterwards, but ♂ of early group
acted like A ♂ in B territory. Prob. some
dist. found B over S. Ridge down 2 from A.

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ing, went on up Long Indur., not urged by ^A ♂. They joined 3 coming down indur., without animosity. (all ♂♂?). 9:22, all but L ♀ of the 5 ^A ♂s prone. 9:25, ♂ up + faced up canyon toward 5 which were 400 yds. away. 9:27, ♂ prone again, then L ♀, so all 5 down. 9:41, ♂ up as 20± approached slowly from 400 yds. up Long Indur. ^A ♂ walked toward slowly, across A territory. (Absent). 9:44, halfway to big group, ^A ♂s. The 20± retreated when ^A ♂ 30' away. ^A ♂ stopped, then pursued at slow run, tail out. Brown ran slowly away together. ^A ♀♀ remained prone (9:45). ♂ again ran after group + ^{went} out of my sight over rise. 9:49, ^A ♂ running back toward ♀♀. Stopped 200 yds. from them + defecated. L ♀ then D ♀ up + faced oncoming ♂. Latter stopped 100' away. 9:52, one imm. roll, then up. Then other imm. up (all up). ♀♀ walked 50' toward ♂ + all grazed. 10:16, L ♀ defecated. 10:18, ♂ prone 50' from ♀♀. 10:21, one imm. d. + u. same pile. 10:29, ♀♀ quickly walked 50 yds. to eastward along contour. ♂ rose, defecated same pile, + followed ♀♀. ♀♀ to rivulet in green wet slope + drank. ♂ also drank (first time today?). 10:34, one imm. prone in dust bowl. Then D ♀ + other imm. prone 10-15' away. 10:36, ♂ prone. 10:41, L ♀ prone. All prone within 25' distance. Now continuous fair wind up the canyon. Very clear + dry. 10:59, ♂ extended forelegs, one at a time. 11:06, D ♀ lay chin on ground, neck extended in front of body; then lay on side, neck on ground; then prone again. 11:25, all but ♂ + 1 imm. rose + looked toward crest S. Ridge. a immature appearing one ran to group (all up) + walked among them, tail up vertically. It ran a few steps after 2 ♀♀. Not chased by ♂. Left

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of own accord 11:27 & walked 100' NE, then SW along sidehill passing 100' above B, then ran + walked on SW. ^A B ♂ does not attack young ♂ ♂ vigorously? ^A B ♂ took 2 drinks (10-15 sec. each) in depression in mat, then prone in dust bowl. An imm. rolled, then grazed. 11:34, imm. rolled 1 side, then other, in dust bowl, then rose. 11:35, back ad. ♀ ♀ rolled in dust. D ♀ rose + shook body. L ♀ rose 11:36. Dark gray dust remains in its fur. ♂ remains prone. 1150, ^A B ♂ rolled once on side, twice other, shook head, rose. ^A B walked 50 yds. S. A lone adult ♂ ^{(B ♂) actually} defecated 100 yds. uphill from ^{A's} B's former position, then grazed 150 yds. from ^{A's} B. 3 others ^(then later found to be group B.) came over crest S. Ridge + grazed 100' from ^{B ♂} ~~ad ♂~~, + 6 appeared at crest S. Ridge 200 yds. uphill from ^A B near lower Indian Market. One of the 6 a young of year. 11:56, 1 of ^A B imm. rolled in dust. The ^(B group) 1 + 3 drifted eastward along S. Ridge, + also the 6, grazing + moving slowly (12:03). One ^A B imm. prone (12:03). 12:06, other ^A B imm. prone. 12:15, of 6, 2 adults on side, 3 ad. + 1 young rolling. 12:15, 2 ^A B imm. up; D ♀ down. 12:20, 1 imm. down. 12:23, L ♀ down. 12:24, other imm. down. 12:25, ♂ down (all 5). 12:34, the 6 down (to E) S. Ridge; chased by 1 of 4 (♂ ^{of B.} + ♀ ♀?). 12:37, ad. ♀ ♀ up + watched chase. 12:38, 1 imm. up. D ♀ + another def. + imm. 12:40, ♂ up. 12:45, ♂ defec. same place. 12:50, ♂ prone; yawned. 1:10, ^(came, one) new imm. up + join grazers. 1:12, ♂ up. D ♀ prone. 1:12, The 4, ♂ + another prone, at area where ^A B was at 6 a.m. 1:33, D ♀ up + grazed with others (all grazing). 1:47, ♂ walked 50' eastward, rolled, then over dorsally + prone. All 4 others rolled within 10 yds. of ♂. ♂ + 2 ♀ ♀ remained prone.

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1:49, ♂ rolled again, then up + 50 yds. eastward to the 2 min. ♀♀. Two ad. ♀♀ remained prone. The 3 moved back toward them. By 1:54, all but one ~~ad.~~ ♀ prone; all quickly up 1:55. 1:56, young at imm. prone again; up 1:57 + grazed (all up). 2:06, ♂ walk quickly 50' down slope; defe. + urinate. Then imm. ♀ d. + u. same pile. ♂ approached it from rear; it walked off. ♂ moved pile + gave wolf howl; ^{defecated briefly.} repeated, then walked 5 yds. + lay prone. Imm. then d. + u. same pile; another ♀ on pile 10' distant. ♂ imm. then defe. briefly on this second pile. In all at least ♂ + 2 ♀ (at least 1 imm., prob. both) defecated. 2:23, one imm. prone. 2:32, ♂ rested chin on ground - up at squeal from ^{of 4 (B)} lunch at foot of slope 200 yds. NE of Rock Shelter (~~could there be B?~~) - one of these 4 is imm. + now in B lower territory. 2:56, imm. ^A Brose + shook out dust. 3 p.m., ^A 4 ♀♀ walked 100 yds. up canyon. Leading one, ad. ♀, drank at depression in green mat. One imm. rolled + lay prone; up 3:06. This group 5 in A territory, ~~seemingly~~ ^A. By 3:30, no more lying down. The group had worked 75 yds. down the canyon to 50 yds. NW of Rock Shelter. I believe have watched same group all day - sure since 7:55. Possibly switched groups between 7:45 + 55 when hummer watched groups passing behind hill to NE of me for 200 ± yds., but earlier failure to chase groups in B territory seemed unlike Bot. When B group appeared at 11:50, the ⁵ were in A territory. The gaining of 1 by watched group at 8:54 was probably return of one separated ^{(from 6).} since last evening. 3:42, ^A ♂ prone. 3:49, ♂ up + grazed with others. 3:54, ♂ rubbed neck on ground then lay prone. 4:56, one rolled then up. 3:53, imm. prone, rolled,

Vicugna

August 13, 1951

Aricoma, 15000', Depto. Puno Per U.

up. ♂ + 2 others rolled; ♂ + 1 ad. ♀ remained prone - all up quickly 4 p.m. // Group B about 300 yds. NNE of House at 4 p.m., on edge S. Pando Flat. // 4:08, two ^{stronger} walked SW 200 yds. up slope to NW of A. A ♂ walked 50 yds. toward them. A ♀♀ moved slowly 50 yds. up canyon; apparently not going to descend to near House this afternoon. ♂ loped toward the 2 & they ran up canyon, slowing to walk when 50 yds. ahead of ♂. 4:15, ad. ♀ defec., moved pile, defec. again. ♂ remains 200 yds. from ♀♀; the 2 150 yds. up canyon from ♂. Fair wind continues up canyon; smoky haze. 4:20, A ♂ ran S. across + up canyon, not toward the 2, apparently chasing some ^{hidden} ~~not in~~ from my sight. 4:24 one ♀♀ walked 200 yds. up canyon to near the ♂ & another ^(small one; probably 6th of A), now grazing. Two ♀♀ walked to NE 100 yds. so group spread 300± yds., & one lay ^{ad. ♀} prone (4:26). By 4:30 the 3 up canyon had walked halfway to furthest down 2 & had joined the fourth. The 4 + 2 remained 200 yds. apart. 4:40, prone ♀ up & grazed. 4:50, an ad. ♀ defecated. 4:52, the 4 up canyon ran to the 2. Another ♀ defecated on same pile, then the ♂. All continued on, ♂ last, down slope toward S. Pando Flat. to 50 yds. over break of slope they stopped to graze. B ♂, on flat below & 300 yds. away, loped toward them, & the 6 ran back up slope when B ♂ still 150 yds. distant. The 6 went to foot of Long Mdw. & grazed (4:57). Same 5 p.m. (sunset at House). // Watched all up & down & defecations today so record can be used quantitatively. ^{Possibly} ~~Probably~~ shifted from watching B to A at 7:55 a.m. ~~had not defecated~~. Saw 2 again A group during the day; at 8:55 a.m. and 4:25 p.m., reconstituting 6 (3 imm; 2 ad. ♀♀, 1 older ♂).

Vicugna

August 14, 1951

Aricoma, 15000', Depto. Puno, Peru

Clear & dry. 7 a.m., the 4 B's near crest of S. Ridge, one prone atop rock outcropping at crest; N. of Rock Shelter. Group B 200 yds. NW of R.S. grazing on green mat slope at edge A territory. About 11:45 to 12:30+, 6 of group A 100' N. of House. 2:30, I saw 6 (1 young of year) in Loop. They squealed at 200 yds., I in open, & later allowed me to approach to 100 yds., I on road, before all ran 50 yds. away & then turned to face me. About 3:15, group B, 4, below foot of Long Mdw., nearly down to S. Ponds Flat.

August 15, 1951. Clear. At 7 a.m. group B $\frac{2}{3}$ way up S. side S. Ridge, N. of House. 8 a.m., B, 4, on upper green mat near foot Long Mdw.; one of A 100' from B & other 200 yds. up Long Mdw. At 8:45 a.m., 6 in Loop (1 young of year), 5 ~~prone~~ lying down. 1 or 2 rose when I walked by 200 yds. away, then prone again when I was 200 yds. past. At 10:45, these 6 about 100 yds. from earlier site, one prone uphill from grazing 5. 2:30, group B grazing on S. Ponds Flat 400 yds. NNE of House. Several Indians walked through this area about 4 p.m.

August 16, 1951. About 9 a.m., group of 6 above lower road uphill from Waterfall in Loop. Sheep, llamas, and alpacas grazing in Long Mdw. & groups A & B not present there. Indians living at Rock Shelter.

August 17, 1951. About 8:30 a.m. a group of 6 was on S. side of S. Ridge near N. end of S. Ponds - perhaps group A. Group of 6 above waterfall where yesterday at 11 a.m. Sheep & guanaco in Long Mdw.

Vicuña

August 18, 1951

Aricama, 15000; Dpto. Puno Perù.

at least 5 on S. side of NE and S. Ridge 7 a.m. A? at 2:45 + 3:15 p.m., groups of 5 (one young of year) in loops of road. ~~Below~~

CRUCERO Pampa 3, 13500-15000'

August 20, 1951

The alpacas & sheep still in A & B territories. We drove via Sandia junction & Potos junction to Finca Calacala m. Butina. From Crucero-Linibani junction, toward Potos, saw groups of 11 (1 young) 5.2 miles out, a single .1 mi. further, & 9.8 miles out, 4 A1Y (very young + pale color) .9 mile further. Beyond Sandia junction .5 miles saw 5 and 9 near river (many alpacas here), and 13.5 miles beyond junction groups of 9. Half a mile before Potos junction saw 3. Wind + overcast prevented a good watch for vicuñas today.

August 21, 1951

Hcda. Calacala, 13000; Dpto. Puno

Snowing all day. Vicuñas in pasture in 6-8" snow seemed little discommoded. Many lay prone as usual & others apparently grazed in openings - saw no pawing away of snow. The Indian workers brought coarse hay & threw it on snow. The vicuñas came to this & ate it, coarse & long though it was. // Sr. Paredes says the ♂ fight ♀♀ at all times year & bite them. The hybrid ♂♂ especially had become larger, & most of them are first bled with ropes. He repeated story of a large number being in corral during severe storm with thunder & lightning & many being killed by dashing against the stone walls. // One young vicuña died in snow & buried in it; I saved head.



Viciña

Peru

August 26, 1951.

25 \pm mi. NW Putina, Dpto. Puno,

On road from Putina to Muñani to ^{Picotani} ~~Ficusani~~ (sp?), when 32.5 miles from P. in short grassy high rolling country at 14000 \pm ' saw 4 A 2Y on road. They started ~~suddenly~~ ^{suddenly} when car approached. Few rocks + no brush here. At ^{Picotani} ~~Ficusani~~, 35.6 mi. from P., saw group 28 and another of 10 in similar short grass area.

August 27, 1951.

Aricoma, 15000', Dpto. Puno

100 \pm llamas, sheep, alpacas, near house in forenoon. At 5 p.m. went to Rock Shelter. Saw 3 in A territory 200 yds. to W. Group 5 about 1/4 mile further up Long mdr. One (the usual lone one?) 200 yds. S. of house. Grazing on spots not covered with snow.

August 28, 1951. At 7 a.m. Sat Rock Shelter. Overcast. None detected in old B territory. Across Long mdr., 300 yds. W. of R.S.,

3 atop low rock outcropping (1 prone, ^(prob. A)) and 2 among shrubs at ft. steep slope 100 yds. N. of the 3. One of the 3 gave warbling whistle toward me. 150 yds. further up Long mdr. on lower

slopes of S. R. Hill, a group of 5 grazed. ^(prob. C) 1 stalked to closer position. 7:30, two discrete groups 5 as before (call them U (upper) and

^(prob. A) L (lower). Apparent σ of U. stood apart from others as if watching + lay prone 7:35. One of L. also prone (not ad.). Only 1 or 2 of L. are full adult appearing; other 3 or 4 perhaps 1 or 2 yr. olds.

The 2 groups 150 \pm yds. apart. By 7:45, two of L. (two young 100 yds. from 3) prone. By 7:45, $\frac{1}{2}$ more of U. prone, 2 others rolled on grass

on slope (1 up after 5 \pm min. down, other remained on side). 7:52, apparent σ of U. up + grazed; both hind knees muddy. Of U., 1 lying, still, + 1 prone (7:55). One of prone L. up. 7:55, one

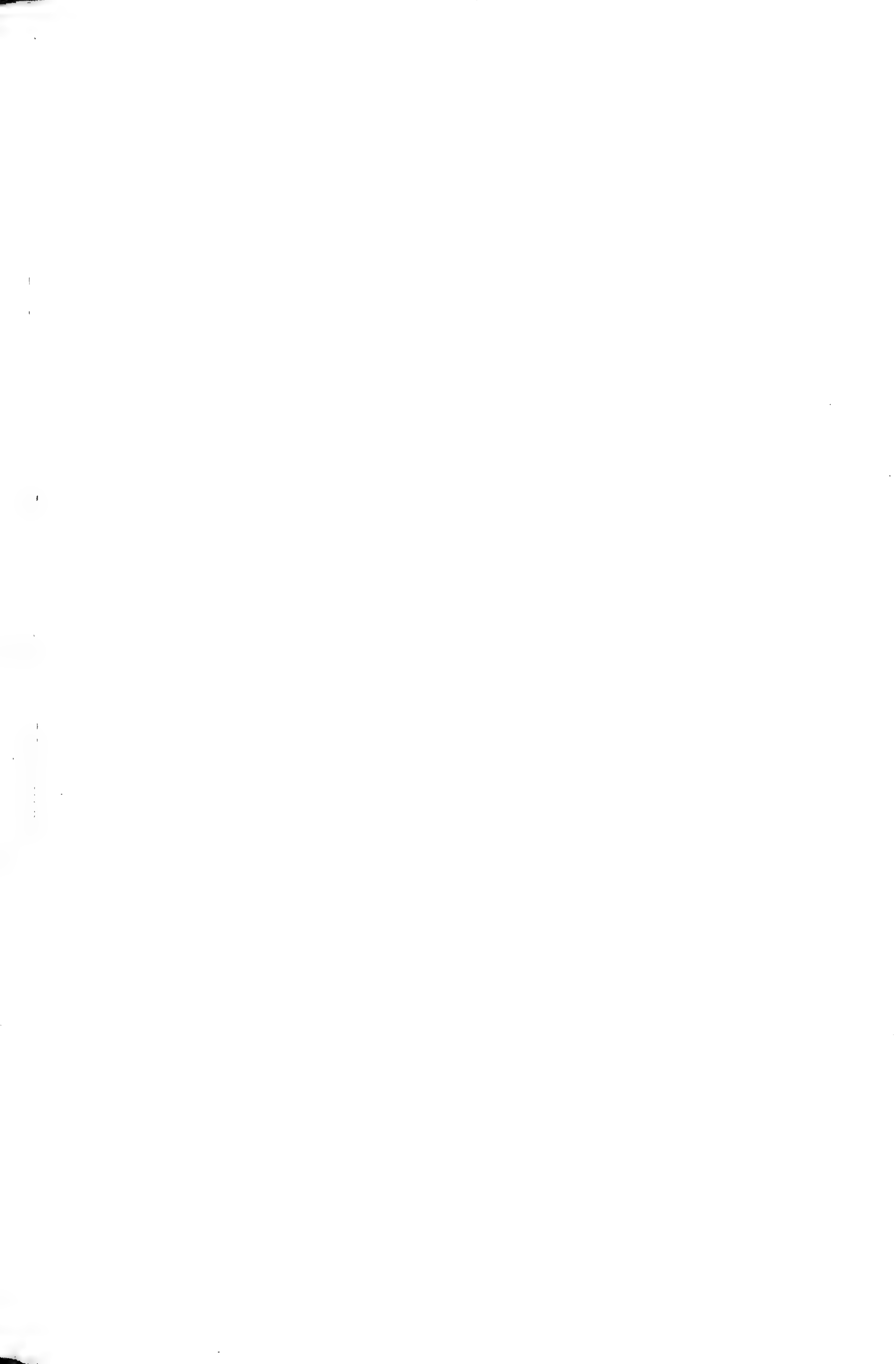


Vicugna

August 28, 1957

Aricopina, 15000', Depto. Puno, Peru.

♀ defecated on snow; ears back or another approached. Second defec. briefly same spot. Both appar. ♀. ♂ of L. redder & thicker necked than others. L. is in A. territory & resembles A; may be A, now only 5. U. groups probably one as formerly in upper long mdr. No hesitation about walking on & "deep crusty snow but feeding only, when ground not covered. 8:04, of L.; one of separated 2 young prone (switched positions?). shy alto. rumble & alto. stroke, 9/10. Faint breeze. 8:05, all U. up & grazing. One defec. on pile. Then on dry grass moderate slope, E. aspect. Presumed ♂ walked 50' from others as if looking up canyon. By 8:10, one ♂ of L. prone on rock outcropping, so ♂ & 2 young prone (1 young with chin resting on rock of slope). 8:15, one of young up. A ♀ of lower 3 prone, so ♂ & ♀ prone, 10' apart. 8:17, another of lower ♀♀ prone (3 down), so 4 of group 1 down. 8:19, 2 of U. prone on slope & other 3 grazing. They look up canyon from time to time - I hear cattle there. The apparent ♂ of U. walks 50' along slope up canyon & stands on rock outcrop, looking up canyon. 8:25, only apparent ♂ of U. still up, other 4 prone. All 5 of L. prone. ♂ of L. easily distinguishable as other 4 youngish. 8:28, ♂ of U. prone 25 yds. from nearest other, so all 10 prone, chewing cud. Weak sunshine at times. Check bulge as with a wad of coca when chewing cud. 8:39, two upper of L. up & feeding near bare bushes & among rocks (all 10 down 11 minutes). 8:41, ♂ of L. up, then a thin ♀ near it, so only 1 of L. still down. ♂ of U. rose, walked down slope and up canyon (8:42) slowly. 8:45, 100 yds. from nearest ♀. ♂ stopped where green wet mound protruded out of snow & grazed; ♀♀ remained prone. 8:45, last of L. up, & the lower 3 grazed.



Vicugna

August 28, 1951.

Aricoma, 15000', Depto. Puno, Peru.

ed near rock outcroppings & at edges snow. One walks from open spot to spot & feeds. Some spots scarcely larger than muzzle of the vicuña. 8:54, U. ♂ walks quickly up canyon until 200 yds. + from ^{its} prone ♀♀, then on out of my sight. 9 a.m., one of U. ♀♀ rose, grazed (the 4 down for 35 min., perhaps 40). 9:08, another of U. up & ♂ had returned to 50 yds. from nearest of the 4 ♀♀. Of L., the 3 had crossed 100' snowy area to uncovered foot steeper slope. The 2 still 50 yds. distant from them at about same place as at 7 a.m. Solid alto-stratus overcast. 9:21, by mutual drifting, one of separated 2 of L. now with the 3. Two of U. still prone while 3, spread 50', graze 100' away. 9:25, L., one ♀ approached another from rear, & ~~one~~ latter put ears back & turned head back as if spitting. One L. ♀ pushed neck along ground, walking with hind feet, then lay on side & thrashed 3x. Repeat up, then down again & thrashed - repeated about 5x. 9:30, same 2 of U. still prone as before - 1 hr. 5 min. or + prone. 9:35, 2 of L. walked up slope 50' from others, apparently coming into view of U. ♀♀. Last 2 U. ♀♀ up & there joined by 2 more. They quickly walked 50' toward L., 75 yds. away, stopped, & loaded. Apparent ♂ of U. 50 yds. up canyon from ♀♀. 9:37, one of U. ♀♀ prone & others not watching L. 9:40, second U. ♀ down. ♂ stands on rock outcrop looking across canyon to 3. 9:43, upper 2 of L. grazed near bushes at foot shale slide; one prone on shale. 9:45, U. moved 50 yds. uphill to highest vegetation (bushes, grass clumps) at foot shale slide, ♂ 100' downhill from ♀♀. Two ♀♀ defec. simultaneously 50' apart; other 2 ^{then} used same pile as one.

Vicuña

August 28, 1951.

Aricoma, 15000', Dpto. Puno, Peru.

on dry grass hillside, 200 yds. SW along sidehill from L. 11:03, L. ♂ up. The 2 young ♀♀ moving away from group, to NE, along sidehill. ♂ followed, then other 2 ♀♀ up & followed. The last 2 lattered (out of sight), ♂ overtook 2 leading ♀♀ & grazed with them (11:10) about 200 yds. from starting point on green mat slope.

11:15, U. as before, ^{prone one rose.} ~~same one still prone~~. High on slope 1/4 mile SW of U., group of 7 (where 5 seen earlier). 11:20, U. walked 50 yds. down slope. 2 rolled on grass slope. One (♂?) lead 50 yds. & others followed onto gently sloping green mat. One defecated. All U. grazed within 100', on mat. They looked toward 7 high on slope, 300 yds. distant. By 11:50, U. about 50 yds. from where first walked grazed on green mat. 11:50, ♂ & 2 ♀♀ of L. moved 50 yds. down slope & continued grazing on mat. Since 7 a.m. U. had ^{ranged over} moved about 300 yds. & L. about 250 yds., & ^{about} ~~just~~ 50 yds. width in this range. By 12 M the missing 2 of L. had not reappeared - ~~so~~ probably behind rock hummocks. Stratus overcast complete. Fair breeze up canyon. I left. || 2 p.m., one

alone 250 yds. SSE of House - probably usual lone one. It not near E. Ponds as all ground snow covered there.

At 3:15 I was in bottom SE Canyon near Ice Creek & saw 7, about = size. At 200 yds. there gave alarm calls & ran 100 yds. across & up slope. Horses & llamas in SE Canyon below Ice Creek.

August 29, 1951. At 9 a.m. saw 7 about where seen yesterday in SE Canyon, 1/4 mile SE of junction Ice Creek & SE Creek. Whistled at me 1/4 mile away but 4 prone did not rise. || 1 p.m. saw 7 run across upper B territory. ||



Vicugna

August 20, 1951.

Aricoma, 15000', Cbo. Puno, Peru.

Another group of 5 equally high on slope $\frac{1}{4}$ mile SW. up canyon from U., one 100' down slope from others at head of rock outcropping. Evidently some disturbance - stock + Indians probably - in basin to S. of vicuñas $\frac{1}{2} \pm$ mile. 9:50, U. ♂ prone. 9:55, L. as before, 1 prone, others feeding near snow covered ^{ground.} By 9:58, all of U. prone, spread 50 yds. 10:03, L. ♂ prone on ^(off snow) bare ground spot on short grass - up by 10:06 but another down (2 of L. down prone). 10:09, another L. ♀ prone. 10:11, L. ♂ prone + gave a yawn, lifting muzzle high. 3 of prone L. on snow covered parts ground but ~~at~~ within 6" of snow covered ground. 10:13, last of L. prone and all of U. still prone - all 10 down again 10:35, first of L. to lie prone up, + second too. L. ♂ up, moved 50', + again prone. Upper 2 ♀♀ of L. walked 50 yds. toward U. (still all prone). U. ♂ stood up. Longest prone of L. down 9:43-10:35, 52 minutes. U. ♂ 100' toward the 2 L. ♀♀ + they walked back toward their group. 4 ♀ rolled. Soon ^(10:40) up. Another U. ♀ up, shook body. At 10:43 last of U. rose (3 L. still prone, incl. ♂). One U. pushed neck + side against a 1' high bush. Two of U. brushed head or neck through 1' high bush. One ^{U.} rolled, turned over downhill, thrashed on side, prone, up. A third of L. up. U. walked together quickly down + snow slope toward L. 5 yds.; ♀♀ stopped + ♂ continued on 75 yds. + chased 2 nearest of L. all ^{of L.} but 1 ♀ rose. Chased 2 young ♀♀ ascended steep rocky slope. U. ♂ stood 50 yds. from L. ♂ which did not even face it. 10:52, U. ♂ started walking back to its ♀♀. One of U. ♀♀ prone. 10:55, L. ♂ + a ♀ prone, so 3 down. The chased 2 young L. ♀♀ grazed higher on slope where had stopped after chased. U. grazed



Vicugna

Per J.

August 29, 1951.

Aricoma, 15000'; Dpto. Puno,

at 5 p.m., 3 grazing 250 yds. NNE of House in former B afternoon territory.

August 30, 1951. 8 a.m., 2 AIV near Ice Creek halfway down side of SE Canyon. Far uphill when I approached. 7 on flat near junction Ice Creek & SE Creek. 4 about $\frac{1}{4}$ mile S. of the 3 on green slope. Found fossils of one not long dead near Ice Creek. Stock & Indians in SE Canyon. || About 4 p.m., group of 4 on old B territory about 200 yds. N. of House - still at 4:30. at 4:30 two others in Long mdr. 200 yds. up canyon from ^{Rock} ~~stone~~ shelter.

August 31, 1951. at 8 a.m. a group of 4 about 150 yds. NW of ^{Rock} ~~stone~~ shelter on near edge of A territory on green slope. Two or perhaps 3 adult, at least one larger banded & smaller. No sign of groups in B territory. || 8:45 a.m., about 200 yds. S. of Ice Creek halfway up slope of SE Canyon, 2 adults & 1 imm. at about same place as yesterday. They ran across slope below and parallel to my route, ~~then~~ and after 500 yds., among rock outcroppings, then uphill ahead of me. about $\frac{1}{4}$ mile S. of this group was group of 4, as yesterday, on flat thick green mat. They ran uphill. Each group gave alarm call, only one individual calling, second calling several ^{notes} higher than first. —

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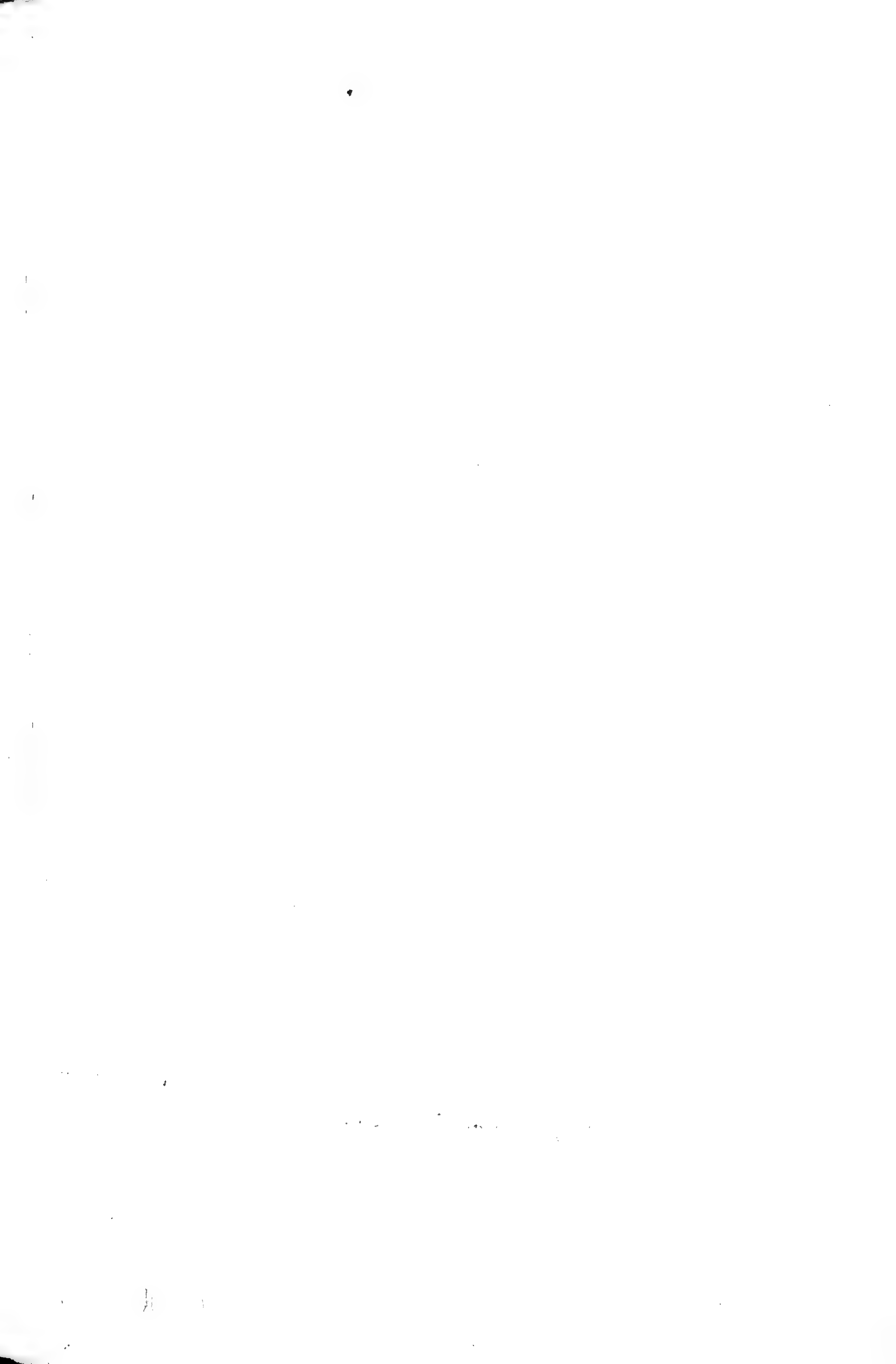
50' closer). 3:48, # one of A, then others, ran down canyon toward B. a dog was running down canyon toward them. B group ran 100' up hill & dog passed 100' below them chasing A. about 300 yds. NE (along sidehill of S. Ridge) two of A turned up slope & dog continued after the other, ^{vicuña's} tail up. One of the 2 ran after & passed the dog & joined fleeing other. The two ran

Journal
Vicugna

August 31, 1951

Aricona, 15000', Dpto. Puno, Peru.

~~9/10~~ at 8 a.m. Clearing by noon, then 5/10 cumulus by 2 p.m.
~~The 60 traps held 1 P. dominicus, 2 Akodon jelskii, 1 Neotoma,
 1 Lagidium, 1 Peromyscus. Picked up all but about 16 traps.
 Put up Peromyscus & Neotoma & discarded others. || 3:15,
 sky 9/10 cumulus, fair wind up canyon. I went to Rock
 shelter. 6+ alpacas grazing 1/4 mile W. in Long Mdw. 100+ sheep
 & guanaco near S. Ponds. 200 yds. W. of Rock shelter a group of
 3, 1 apparently ♂, another adult, 1 younger, there on A territory. On
 upper B territory 200 yds. NW of Rock shelter, a group of 4 - ♂, 2 adult
 ♀♀, 1 younger (B?). Two groups 150 yds. apart. The A ♂
 quickly ran toward B group & was met, at usual A-B bound-
 ary, by B ♂, tail up. The two ♂♂ stopped 50' apart, & 2 min.
 later A ♂ walked 100' back toward its group. 3:30, group 10+
 llamas came walking down Long Mdw. toward A ♀♀. One walk-
 ed rapidly 100' ahead of rest, & toward A. The A ♀♀ ran when
 llamas 100' from, ♀♀ ran to ♂ and all to group B. They stood
 50' from B, about on territorial boundary. B did not flee. In
 3+ minutes the 3 of A drew up canyon to 100' from B. The llamas
 grazed 50 yds. down slope from the 4+3; no reactions seen be-
 tween vicuñas & llamas. 3:38, B ♂ ran fast at A ♂ with a single
 screech (from which?) like tire squeal on corner. B ♀♀ remained
 grazing. A group fled 100' 50 yds. B ♂ stood between the 2 groups,
 defecated on pile. B ♂ urged 3 A's a few yards further, then stood
 50' from A. 3:45, A ♂ ran a few yds. toward B ♂ & it retreated,
 tail up. B soon walked 50' back to pile, defecated, then walked
 back to 50' from A & grazed. At least 2 of A called on dry grassy
 slope. 3:47, B ♂ walked quickly 75 yds. to its ♀♀ (they had come.~~



Vicugna

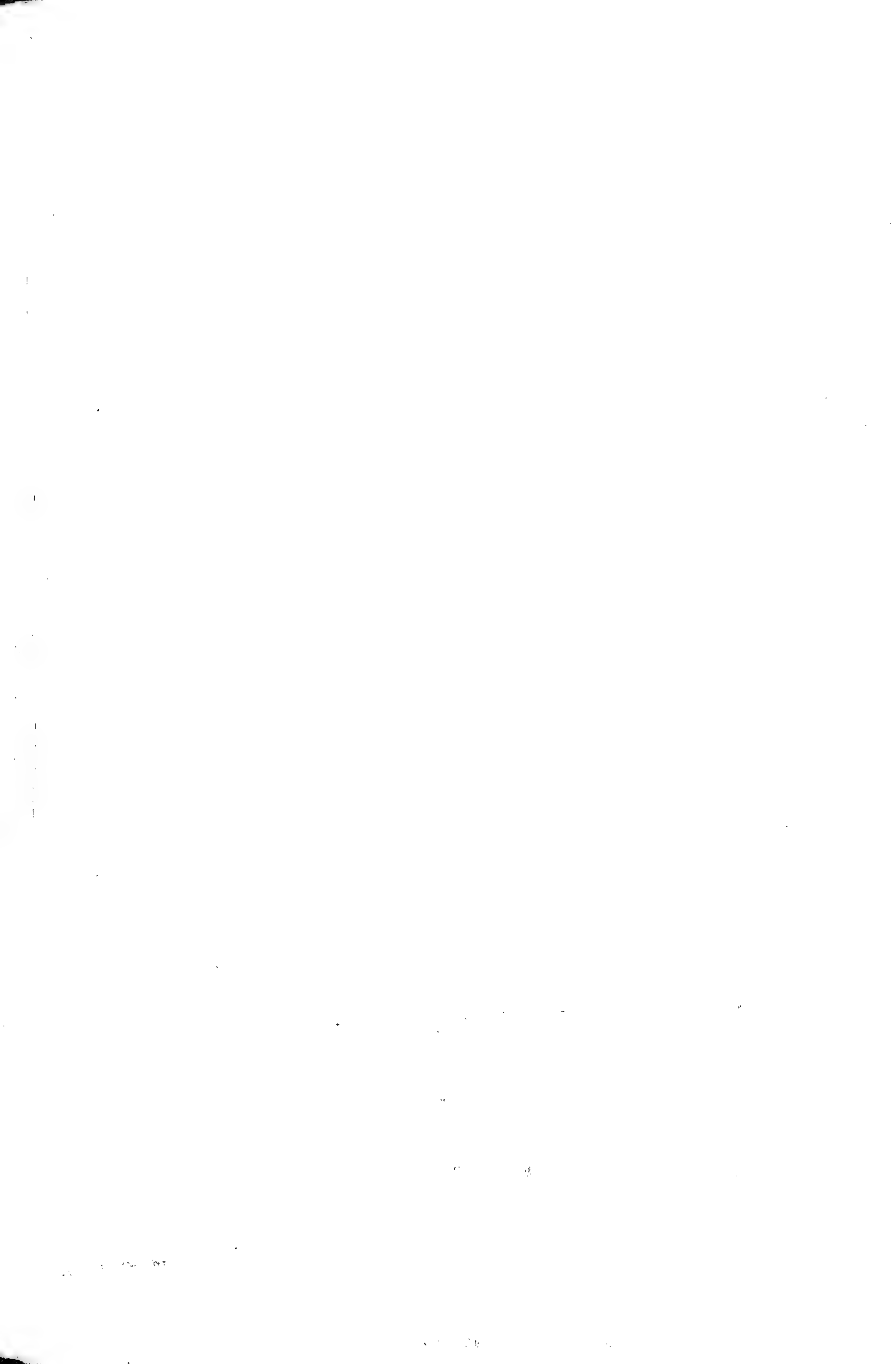
August 31, 1951

Aricoma, 15000', Depto. Puno, Peru.

easily, not gaining on dog, to N. end of S. Ponds Flat, then up onto rock outcroppings of S. P. Hill. Dog fell at foot hill, stopped, & walked back to flock watcher. The one remained atop S. Ridge when other 2 out of sight 500 yds. from it. The 4 of B ascended hillside toward Indian Markers - Indian woman came down Long Mdw. driving llamas out. A fifth (the odd one of A probably - youngish) tried to join B but as some hostility shown it walked down slope ^{to} 100' below B, to green mat (upper B territory). 4:04, this lone one ascended slope of S. Ridge & was chased over ridge by B (♂?), head low & tail up. 4:05, the 2 of 3 B ♀♀ lay prone near Lower Indian Marker near crest S. Ridge. 4:08, ♂ grazed 50' from ♀♀, 2 still prone; lone one out of sight over S. Ridge. 4:20, one prone up; all 4 within 50' distance. Same 4:35. Fog at termin. about 4:50 a lone one in A territory - the odd one? The B group went over crest of S. Ridge.

September 1, 1951. At 7:15 a.m., sky 7/10 cumis, faint breeze, no livestock near S. Ponds. "Lone Joe," the single, grazed 200 yds. E. of House. B, 4, ♂, similar ♀, paler ♀, & imm., grazed near N. ft. of S. Ridge about 400 yds. N. of House (one prone 7:18), this slope now free of snow except for occasional small patches. Group A, 3, 400 yds. up Long Mdw. from Rock Shelter. One imm. & 2 adults.


A at near edge of green sloping mat. Prone one of B apparently ♂. ^{Twice} it(?) had whistled at me as I approached Rock Shelter but each time it resumed grazing within less than a minute. 7:26, B ♂ up and ran 200 yds. NE along sidehill toward Hut & stopped - probably chasing other. ♀♀ continued to graze. 7:33, ♂ ran 50 yds. back toward its ♀♀, stopped & defecated, then on toward its group.



Vicugna

September 1, 1951.

Aricoma, 15000', Depto. Puno, Peru.

B♂ stopped 100' short of ♀♀ + grazed. A ♂ grazes 100' from its 2 ♀♀. A dog near rock shelter brough descending whistle from B♂, 300 yds. away. B♂ moved 100 yds. toward dog, a few yards at a time, whistling when stopped, standing erect, ears up. A ♂ stood looking toward the whistle, 800 yds. away, but resumed grazing after 5 ± minutes. The whistling kept up about 10 minutes at intervals 10 sec. to a minute. Then B♂ walked a few yds. toward ♀♀ + grazed (7:50). Dog went? - possibly lay down. 7:53, B♂ walked 100' back to rock outcropping 100' uphill from its ♀♀ + lay prone on rocks, rt. wrist first. Before lying down two or 3 false starts usually made by flexing wrist. This time took position slowly. Elbows straight when knees on ground, then body surges backward as elbows flexed so forearms on ground, then surges forward as elbow bent still further. 7:56, D♀ prone 100' down slope from ♂. B about 100 yds. up slope of S. ridge from where at 7:15. A at about same position. About 10 geese glided 100' over A; none looked up from grazing. Fair ^{breeze} wind up canyon (8 a.m.). Lone fox 150 yds. E. of House, grazing. 8:15, two prone B's chewing cud, cheeks bulging. Feeding one turns head ^{sideways} while feeding between rocks. 8:15, Lone fox defecated + about 3 min. later lay prone. 8:20, B♂ rose + grazed among rocks. D♀ also rose, shook out dust, grazed. All moved 50' up slope. D♀ again prone. Rubbed extended neck + side head on grass with cross sweeping motion . D♀ up + grazing 2 min. later. B♂ highest on slope of group. B♂ walked 50' further up slope + defecated, then grazed 50 yds. from ♀♀. One B♀ lay on side, neck + head on ground (8:30). Lone fox rose, disturbed by children 100 yds. away, whistled at them, then ran 50 yds. further from them + stopped. B♀ prone instead of on side (8:35). Geese graze 5 yds. from individuals



Vicugna

September 1, 1961.

Aricoma, 15000', Dpto. Puno, Peru.

of A. 8:35, 30+ llamas + alpacas come over rise at N. end of S. Pando Flat. None of B, $\frac{1}{4}$ mile distant, seems to notice. Sheep ~~follow~~ follow - about 200 animals in all - they scatter over S. Pando Flat + ^{S.} foot of S. Ridge. B ♂ stands + looks, from opposite side of 3 ♀♀, but does not flee or attack tho llamas 200 yds. down slope from ♀♀. 8:45, prone ♀ of B up + grazing, B ♂ 50 yds. from ♀♀ at crest of S. Ridge. A grazing within 100' of 7:15 position. 8:49, 3 B ♀♀ walk 50' further uphill toward ♂. B ♂ walks slowly SW along crest of S. Ridge, ♀♀ following 50 yds. behind, + over crest (to N.) out of my sight. ^(8:55) Lone Jac prone 200 yds. SSE of House. 10 geese still about 10 yds. from A. All A still grazing. Llamas in lower part Long Mdw. (9 a.m.). They swarmed over upper B. range. I went to position 200 yds. from A - they walked away downhill to S., probably mildly disturbed. Found them 300 yds. S., toward S. Pasture. || 10:30, group of 19, prob. all ♂♂, ascending side of SE Canyon 200 yds. S. of Ice Creek. Groups of 5 on same slope $\frac{1}{4}$ mile S. of Ice Creek (4 yesterday). Found bones hind legs + spine vicuña on this slope; possibly died during recent storm. || By 3:30 p.m. all stock cleared from S. Pando area (to near Hut). I to Rock Shelter. $\frac{3}{10}$ curium + alt.-cum., fair wind up canyon. I saw group of 4 atop S. Ridge about 500 yds. N. of Rock Shelter. About 10 minutes later they walked quickly down ^{S.} slope of S. Ridge, apparently group B. ♂, leading, stopped + nosed pile, then defecated. ^{♂ prone 5 minutes.} By 3:55, all 4 at edge of S. Pando Flat, ♂ whistled from time to time - at me or dog nearby, prob. latter. 4 p.m., B walked 50 yds. up slope, ♂ still looking + occasionally whistling ^{ti} ^{sa} for 4:05, B ♂ prone facing my direction, 3 ♀♀ grazing in shadow 100' uphill from it. 4:20, about 1 minute after sun set on its head, B ♂



Vicugna

September 1, 1951

Aricoma, 15000', Dpto. Puno, Peru.

rose & started grazing. 4:25, one of ad. ♀♀ defecated on pile. Then ♂ faced up canyon as black dog loped along 400 yds. distant. B ♂ stared & gave thin whistle. It joined its ♀♀. Dog slowly approached. B walked away. At 200 yds. distance, B ran up slope. ♂ separated from 3 others & ran straight across slope but after 100 yds. ran to join others. Dog continued on - going home, not closing vicuñas. By 4:50 B had not returned, but 3, apparently A, were in Long Mdw. 50 yds. down canyon from 7:20 a.m. position.

September 2, 1951.

Aricoma, to Cuzco & return, Dpto. Puno.

At 8 a.m. in draw east of Summit, where 10 (2 young) when we first arrived here, a group of B including 3 young. Two on a green mat near road near head Lake Aricoma. Seven (or +) in group near outlet of Lake Aricoma. Returning from Cuzco saw group of 7A + 1 small young six miles before reaching outlet L. Aricoma. At 2 p.m. from Rock Shelter saw group of 4, B, on upper B territory. 6± cattle but no other stock near House today.

September 3, 1951. at 6:45, clear with fair NW breeze, I to Rock Shelter.

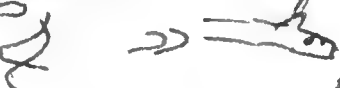
Group A now with 4, grazing 200 yds. W. of R.S. Group B, imm. & 2 Ad. grazing 150 yds. N/NW of R.S. over back of slope leading down to S. Ponds, & one (♂?) 150 yds. down the slope (to E.) at foot, at edge S.P. Flat. The latter furthest from me but only one which squealed when I went to Rock Shelter. ♂♂ seem more cautious than ♀♀ of birds and birds may be approached if ♂ tamed in spite of charging composition. ♂ of A made a foray up canyon toward 4 grazing, on green mat 300 yds. from A, then (7:55) returned to top rock outcropping above 3 ♀♀ & lay prone. The 3 ♀♀ were a dusty adult, & two youngsters (short headed) ones (older than youngest of B.). 7:55, the 3A ♀♀ halfway

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Vicugna

September 3, 1951.

Aricoma, 15000', Depto. Puno, Peru.

down slope toward ♂, & with ♂ at 7 a.m. One of B had moved to Dustier gentle slope 200 yds. N. of House. 7:05, two of Group C lying down at foot slope (of S. Hill). Then another down, & another (4th) by 7:09. The apparent ♂ walked S. 50 yds. from the 4 as if looking at something, then at 7:15 went 50 yds. further S. By 7:15 the 4 & B's together, within 20' diameter, where first (♂?) had been 200 yds. N. of House. 7:15, A ♂ still prone above grazing ♀♀. 7:22, one of C ♀♀ up; & A ♂ up and grazed 50' up slope from ♀♀. By 7:30, ♂ had apparently not rejoined C. A pair green grazed 10 yds. from B. One of A lay on side on slope, side neck & head on ground, legs , while other 3 grazed within 5 yds. Apparently A has gained one imm; since last watched. By 7:38 second C ♀ ^{up} ~~up~~ 2 still down. 7:43, three of C. walked quickly down canyon, 4th rose & followed, 5th 50 yds. distant, remained. ♂ of A, 250 yds. away, started toward closest C's at slow walk. At least 3 of C. defecated. A ♀ lying down remained so, other 2 stood looking up canyon toward C. 7:48, an imm. A ♀ ~~A ♂~~ loped 100' to edge green mat & stopped 50 yds. from lone one of C. The 4 C's, the not attached or approached within 15 yds., walked back up canyon. The A one stood 50' from C's adult. The C adult (♂?) put head low & ran at the smaller one & latter fled. It was chased in a wide circle around C group & finally stood 50' from them or earlier. This bunch moved 100 yds. further up canyon. ~~The~~ llamas, alpacas, & sheep poured onto S. Ponds flat from NE. Group A, 3, walked up Long Mdw. 200 yds. & S. behind a ridge - not directly toward C. By 8 a.m. the area where B was grazing was occupied by alpacas & llamas. Ballanced approach to 50 yds., then walked away to NW, up slope to foot of Long Mdw., ♂ leading 50 yds. behind. The 3 ♀♀ hauled in pockets in green mat.

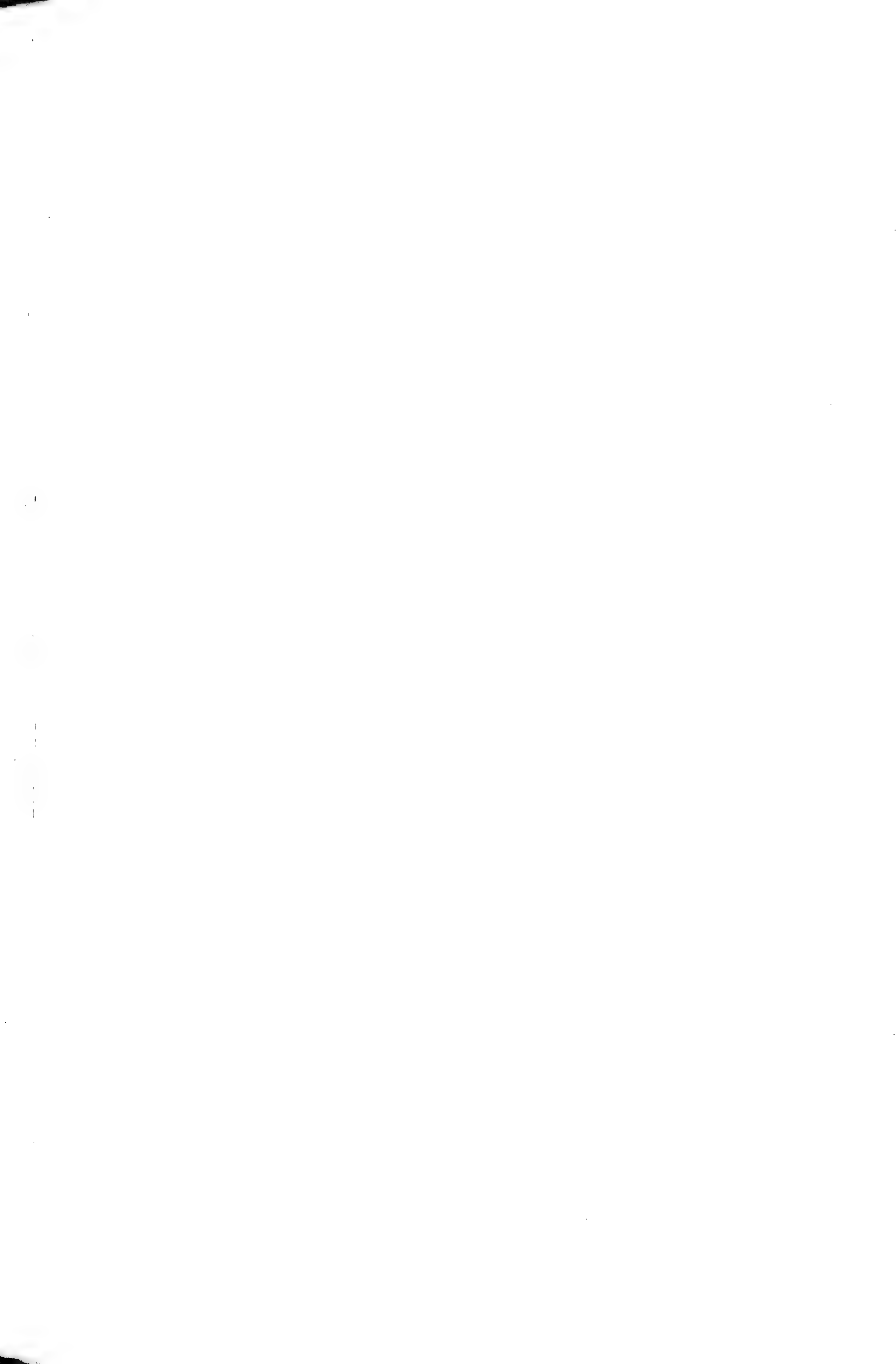


Vicugna

September 3, 1951.

Aricoma, 15000', Dpto. Puno, Peru.

♀♀ then walked toward ♂ + ♂ walked 50' uphill to fence pole. ♂ def., holding stance 20 seconds (had defec. another pile 2 minutes earlier). With telescope, testicular bulges + penis visible at 150 yds. The 3 ♀♀ grazed + ♂ grazed 50 yds. up + across slope from them. ^{Lone} Joe had also retired before advancing stock. B grazed on, moving little. 8:38, B ♂ lay prone at head of rock outcropping, 30 yds. uphill from ♀♀. Livestock 200 yds. or more ^{down} ~~down~~ canyon to E. 8:47, alpacas walked up Long Mdw. 100 yds. down slope from B, but ♂ did not rise nor ♀♀ stop grazing. Some grazing at base brown bunches of grass growing from cracks in rocks. 9:04, B ♂ stood, turned 180°, lay prone again (down 26 min. so far). 9:10, B ♂ up + gone over crest S. Ridge. Then group 3 from that spot ran over ridge + joined 3 B ♀♀, all 6 running 100 yds. Another 3 ran SW along sidehill to group. Then much chasing among the 9, some with tails up, but no contact or cries. Another 2 walked up canyon 50 yds. below the 9. Group then resolved into 4 (B), 5 (with 1 young of year), + 2. Apparent ♂ of 5 walked toward the 2 (adults) + they walked up canyon. B + the 5 stood 50' apart, ♂♂ closest, tails up. 9:22, group of 4 crossed crest S. Ridge near upper Indian Marker + headed SW along rocky slope 100 yds. above B + 5, then higher up slope on dirt slide. Evidently some disturbance by men or stock on Basin side of S. Ridge, 0 of the 3, all adults except the young one. B + the 5 about 30 yds. apart, showing no animosity, at 9:28. The 2 were 200 yds. further up ^{to} canyon on sidehill. The 5 walked 50 yds. from B. ♂(?) and the young one defecated 5 yds. apart on fence rails, then grazed. The 4 high on slide, two prone on grass bare soil (9:34). One

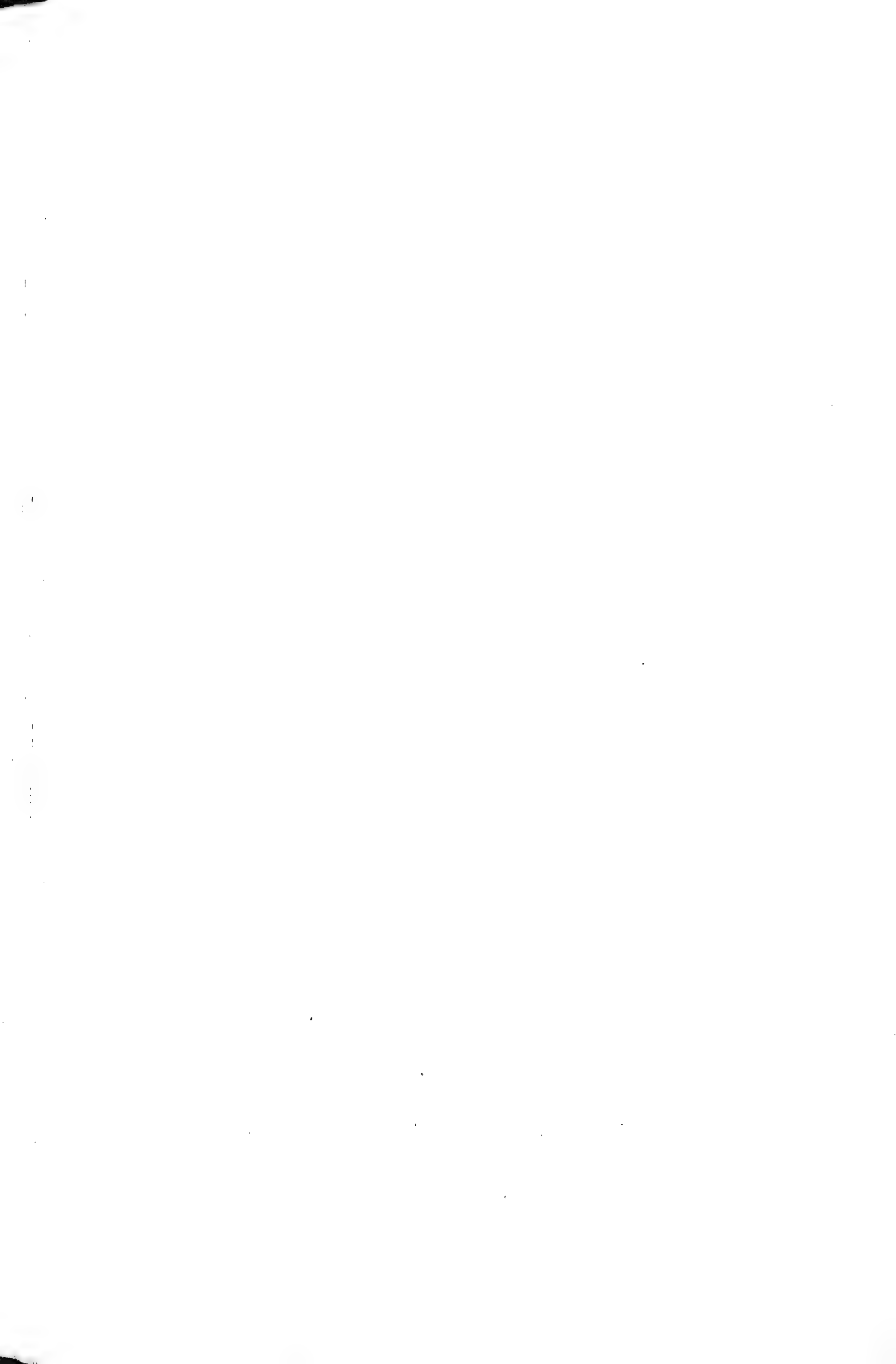


Vicugna

September 3, 1951

Ariconia, 15000', Depto. Puno, Peru.

of B prone. By 9:37, two of B prone - group of 4 AIV grazing 75 yds. along slope from ~~down~~^B + 2, 100 yds. further along slope. 9:45, prone 2 of B rose + joined other 2 in grazing. One rubbed side of head + tip of muzzle on boulder top gently, sideways motion. 9:45, the 5 out of my sight - perhaps over a rock ridge from B. Of the high 4, one stood 50' below where at top of rock outcropping, apparently looking out; it lay prone at this spot 9:55. 10:00, B ♂ 50 yds. across + up slope from ♀ ♀; it rolled in dust, then lay prone. The 4 on high slide as before, all prone. Rose one of the 2 rose 10:05. 10:07, B ♂ up - the 5 went lay close to it + chase ensued for 30 yds. Two others on slope 100' above, + another ran to + joined B ♀ ♀ - there 3 from? The two up canyon ran down canyon, + ~~one (B ♂)~~ ran down to 30' from them; the 2 stopped, grazed, + were not attached. The 4 high on slide stood at the action 300 yds. away. The 5 4 AIV, continued toward crest S. Ridge (middle Indian Markers). ~~It is the X ♂~~ B ♂ grazed 100 yds. down slope from ~~the~~^B ♀ ♀, + 100' from 2 foreign adults; + at 10:14 lay prone there. The high 4 climbed 50' higher + walked over rocks toward crest of S. Ridge. The 4th stayed with B ♀ ♀ (one prone 50 yds. from 3 grazing). 10:25, ~~B ♂~~^{X ♂ up.} Then, apparently ♂ of highest 4 descended 200 yds. to a lone one + chased it briefly, a third mixing in. Apparently one of the 4 AIV ran 50 yds. toward chase + stopped, 50 yds. up slope from B ♀ ♀, then (10:34) walked back to its group near crest of S. Ridge. The high group of 3 (♀ ♀ prob.) out of sight, probably across S. Ridge. Two of B ♀ ♀ walked 50' up slope + lay prone on bare ground. First prone of ~~the~~^B ♀ ♀ up (10:35) + walked to 50' from others. The 4 AIV, one ^{ad.} prone, about 75 yds. along slope from



Vicina

September 3, 1951.

Ariconia, 15000', Depto. Puno, Peru

the prone B ~~♀~~[♂]. 10:40, a third B ~~♀~~[♂] prone with other 2; youngest ♀ grazing. One of 2 prob. ♀♀ 100 yds. down slope, with ~~♂~~^X prone, & at 10:42 ~~B~~^X prone 50' from it. 10:45, recap.: 4 in B, 3 prone + youngest grazing; 3 in X ^[= A], 100 yds. SSE down slope from B; 4 AIX 75 yds. NE along sidehill from B, 1 prone; an odd one prone 100 yds. SW of B along slope, at top rock outcropping; perhaps 1 or 2 others out of sight near last one. 10:50, unim. rolled (once over dorsally) + remained prone with others of B, all 4 prone in distance of 50'. Tolerance of B ~~♂~~[♂] surprising. 10:58, X ~~♂~~[♂] up, & a B ad. ♀, then B ~~♂~~[♂] - a single vicuña appeared on crest ridge 75 yds. uphill from B. This one walked across slope to SW. One of B again prone & ~~♂~~[♂] grazed within a few yds. of 3 prone ♀♀. Second of X prone. 11:05, group AIX still 75 yds. from B. At 11:15 they walked further toward crest of S. Ridge together. A prone + brushed side head on rock. Grazing & grazed within 5 yds. of grass. Only ³/₂ of B still prone. 11:20, ~~♂~~[♂] of X up; one X ♀ still prone. The 4 AIX looked long down the ridge or two approached, the 2 stopping 200 yds. away (11:30). All of X up & grazing 100 yds. down slope from B (or A territory); probably the 3 was group A! One A defec, then ^{lifted} lifted hind foot + muzzled it, head back ^{near} ~~over~~ side flank. 11:37, up one of B prone 5 yds. from others; one of prone rose. 11:42, another B up, then rolled in dust & remained prone - up 2 ± min. later (2 B down). The A group walked 75 yds. across & up the slope as 50 ± sheep & alpacas walked down Long Mdw., so 75 yds. from livestock. Only 1 of B still prone (11:53). The 5 was 100 yds. along slope from B, near middle Indian Marker, & 2 were 100 yds. down ridge from the 5. ~~♂~~[♂] of 5 ran down to the 2 & they fled 100 yds. down slope into

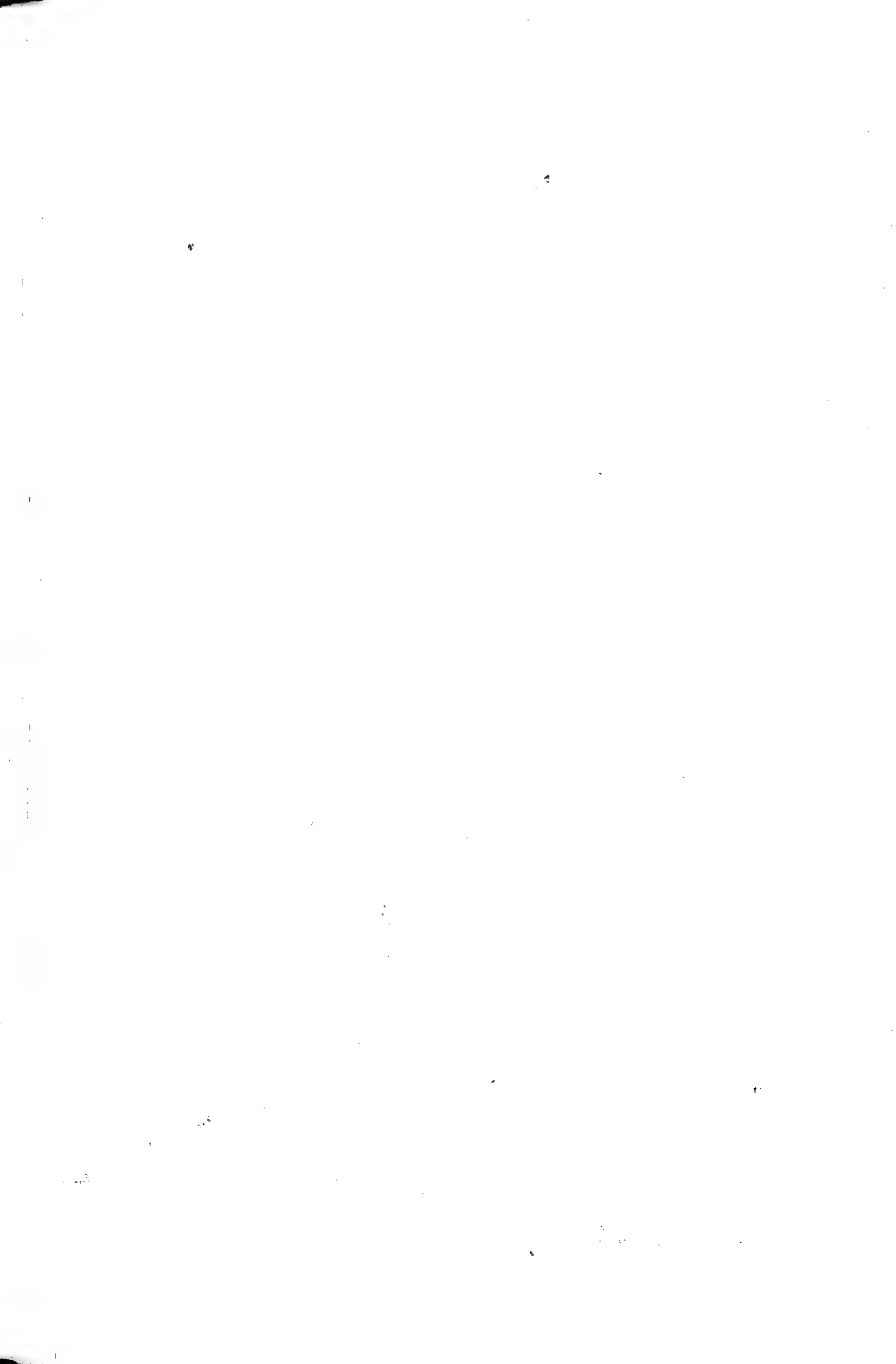


Virginia

September 3, 1951.

Aricoma, 15000; Dpto. Puno, Peru.

frequented B territory. Last of B up & walked a few yds. toward the 5. ♂ of 5 stood 50 yds. uphill from the 2 chased area. 12:02, ♂ of 5 walked back up to its group. At 1:30, I returned to Rock Shelter. Indian woman had just walked NW across lower end ^{Long} Ford Mdw. A group of 4 ^(B?) stood high on slope near Upper Indian Marker. At green mat 400 yds. up canyon a group of 3 (A?), and a group of 4 (C?) 150 yds. beyond them. Fair wind up canyon; 5/10 cumulus clouds. I went 200 yds. up ridge on SE side of ^{Long} Ford Mdw. to watch upper groups. A chase took place - perhaps C ♂ chasing A - about 1:45. 1:50, ^{adult} ~~app~~ of C walked to 100' from A (at lower edge mat), then walked toward 4 which were 75 yds. up slope to NW. One of group C was prone. 2:07, prone C up & grazed with others. A & C 50 yds. apart, A farthest down slope. One of C lay on short dry grass, rolled, rose. Then one C prone. Apparent ♂ of C walked 50 yds. S. of group as if looking at distant object. One C rolled, stood, shook. Another walked to same spot, ~~it~~ went down on wrists as it rubbed head & neck in bunch of grass, thrashed 3x on side, then up & grazed with others. By 2:20 A had moved 50' uphill, & youngest lay prone. The separate one of C had returned to near group, but now it walked 50' S. of others again. 2:24, back to group. 2:29, one of C walked 50' uphill from rest to dust spot on slope; moved it, worked forefoot up & down alternately, lay prone (L. wrist first), thrashed once on uphill side, & remained prone. 2:35, one walked 50' from C, moved one feces pile, then another & defec. there. 2:37, prone one of A up. The C which had defecated rolled on grass, then up & grazed with group. Two groups 50 yds. apart. 2:43, an A adult prone on grass. Overcast & windy. 2:45, a second C prone, & a third. 2:54, a fourth of C prone. ♂ C, only one up, at 3 p.m. walked toward ♀ which rose & walked away, possibly



Vicugna

September 3, 1951

Ariconia, 15000', Depto. Puno, Peru.

spitting forward. ♂ had head high + horizontal, ears back. Two other ♀♀ rose as the ♂ + ♀ approached. ♂ stalled after one, chased it a few steps, stood 5' from it - both with tails up + perhaps ♀ spat forward. Both rolled on grass a min. later. Both defec., 10' apart, simultaneously. One ♀ of C resumed ^{prone posit.} sitting; one on slope remained so. A third of C prone near other 2. Up a draw 50 yds. from 3 of A, a single one grazed. One of C. rolled, then an A 50' away (3:08). Both rolled again, only one side, 2 or 3 thrashes. 3:09, prone A rose. One of C rolled, rose, prone again. 3:20, one ^A walked 50 yds. down slope, to SE, + defecated, then grazed. The lone one walked closer to ^A - a youngish ♀ + perhaps member of A (4 this morning in A). 3:23, this lone one pranced to youngest of A, tail up + looking toward A adult (♂?), then grazed near other imm. (chased away later by A ♂!) 3:25, only one of C still prone; all 5 within 50'; then a second prone. C ♂ ran toward A but stopped 30' from + grazed. 3:33, A ♂, head low, ran at the new imm. + chased it, fast, 150 yds. down the canyon; then ♂ returned to group. The imm. walked slowly down canyon, 50 yds. further + grazed. All of C was up + grazing, 100 yds. from A. The lone one went on down canyon to S. Ridge + Group C stayed together and moved in 3 or 4 trips about 200 yds. S. across the green mat by 4 p.m. The 3 of A remained on mat, grazing - same at 4:15 p.m. + 4:30 when occasional fog.

September 4, 1951. Clear + calm. 6:40 a.m. I was at Rock Shelter.

Group B, 3, just below Lower Indian Marker. Group A, 3, about 100 yds. down Long mdr. from where last seen yesterday - 300 yds. W. of Rock Shelter. Group C, 5, 150 yds. up Long mdr. from A, on lowest slopes of S. Hill. // About 7:45 I crossed S. Ridge about 1/4 mile NE of B and went toward Two Huts. B ♂ saw me, & after I was over ridge it let out loud cry "la fa", somewhat hoarse.

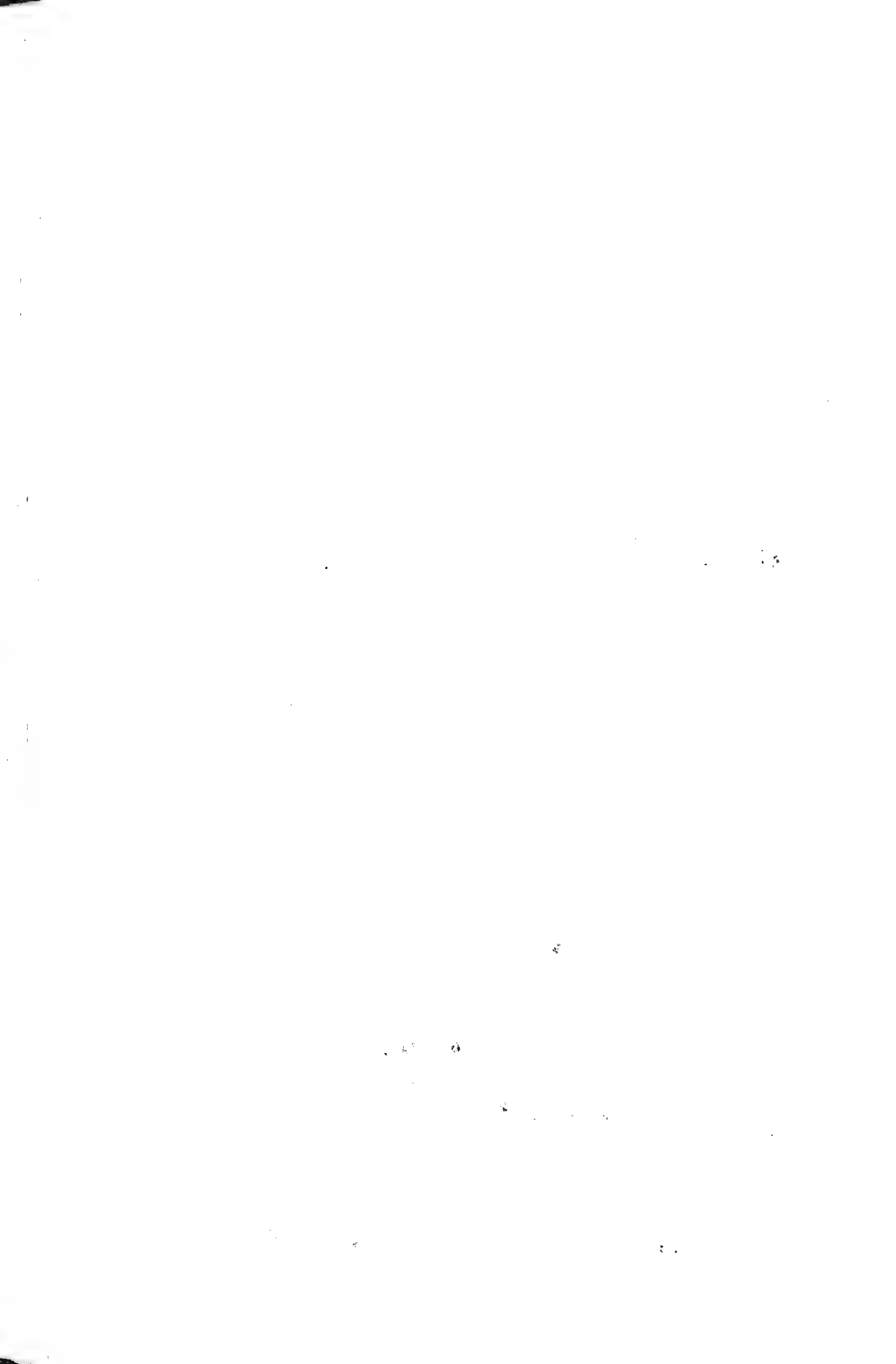


Vicugna

September 4, 1951

Aricoma, 15000', Dpto. Puno, Peru

repeated 4 times, about 100 yds. behind me (It ^{had} moved about 200 yds. toward me apparently). I saw 7 or 8, some chasing going on, near stream below Gray Rock. As I expected I found ^(8 a.m.) group of 5, 4A1Y, about 150 yds. S. of Island Lake, just over S. Ridge from B, 100 yds. below ^(N. of) Lower Indian Market. Yesterday morning this group spent much time high on B (S.) side of S. Ridge. The 4A1Y group seems to consist of 3 adults, 1 imm. (yearling?), + 1 young (of year). All graze on greenish slope, over near Dactylis mat. This is first clean calm morning in a week or more. One adult grazes 50 yds. from rest of group (call it D). The separate one (♀? ad.), prone on mat 8:23, L. wrist first, + chewed cud. Young one among other 4 as one of them. About 500 yds. W. along foot of S. Hill from D, a group of 4 on green mat below rock slide. 8:30, prone one up + grazing. 8:40, ad. ♀ def. + urin. on pile. Reddest one seems to be ♂. 8:40, ♂ looking E. down canyon; gave whistle + other + bunched behind it. ♂ ran a few yds. after imm. 8:42, all 5 grazing - perhaps stock coming into S. Basin. 8:57, a ♀ looked uphill, gave a start, + all 5 ran 50 yds. NE down gentle slope. ♂ + a + at least 1 ♀ drank, then all 5 walked 25 yds. back to ^{W.} ~~down~~ 9 a.m., 1/10 cumulus, fair breeze up canyon. The group grazes, close together. 9:07, sheep, llamas, + alpacas pointed up slope toward D. from NE. Individuals looked at stock, then continued grazing. 9:12, when stock 200 yds. away D walked rapidly 50 yds. up canyon, ♂ leading. Youngster defecated on pile; then an ad. ♀ defec. + urin. same pile. Indian boy accompanied stock + often yelled, but at 100 yds. vicuñas did not flee. 9:15, ♂ ^{noised +} worked forefoot on same fecal pile twice before defecating there. D grazes on half rocky slope. Stock got no closer than 100 yds., then further away. 9:27, juv. worked feet on fecal pile, raised tail vertically, + d. over. brief briefly; do not yet know if ♂ or ♀.



Vicugna

September 7, 1951.

Aricoma, 15000; Depto. Puno, Peru.

9:30, ♂ walked 50 yds. further across + up slope, + others followed slowly. New group 100 yds. W. of 8 a.m. posit. 9:36, one ^{adult ♂} ascended 50' uphill from others, to top of rock outcropping, + lay prone. At 9:50 the grazers had reached the prone one. One rolled, then rose + shook dust out. Juv. rolled at same spot + remained on side. 10 a.m., longest [♂] prone rose, walked 5 yds., put ^{ventral} ~~order~~ center neck to ground, then down + thrashed 3x on side; up, again neck down + all down, thrashed on one side, remained prone (6' from prone juv., both on gray ^{bare} base soil). Another prone 10:03; ~~♂~~ ^(last down ♂) ~~apparently~~ still up. Four down, 10:06; imm. only one up. 10:10, juv. up + grazed. 10:12, stock being driven from W. along sidehill toward D. The two grazers retired to 3 prone. ♂ rose, then others. One rolled in dust. Stock passed 100 yds. downhill from D + all D walked 50' up + across slope. Juv. again defec. on a pile, then ad. beside it (10:18). Livestock withdrew to foot slope, but D ascended a few yds. higher + grazed among rock slabs, dry bunch grass, + *Pycnophyllum*. Sheep worked up slope toward D. Goats worked across rocky ground toward crest of ridge at Lower Indian Marker; 100' from it at 10:38, sheep nearly 200 yds. distant. 11:43, one prone by others on small flat. 10:48, prone one up + all to + past Lower Indian Marker on crest, + out of sight. Nearest livestock 100 yds, 11:04, leader of 4 of the 5 visible on ridge 50 yds. below where crossed. 8/10 cumulus + fair breeze up canyon. ~~11:40~~ ^{11:40} Soon an Indian walked by Middle Indian Marker. I back to house. ~~12:10~~ ^{11:40} Lone fox at SE end of S. Pando Flat. 12:25, from Rock Shelter, group of 4 on A territory opposite, ♂, imm., + 2 ad. ♀♀. Near A-B boundary so could be A or B. Another group of 4 grazed 150 yds. SW. of Rock Shelter. 200 yds. WSW of first 4, two adults + imm., on same slope as first 4;

Like

Sleep bag

DDT

Green tarp

Parha (for rain)

Shotgun -

Ammos - mil. slugs.

.38 pistol

Headlamps - extra batteries.

Shin tools, (sawdust, bird sticks, screws)

Cotton

Snaptraps

Steel traps - ?

Food - crackers Pate

Tea F.

Coffee

Chocolate

Box for specimens ?

Passport, letters, money.

Mosquito net

Bug dope

Vicugna

September 4, 1951

Aricoma, 15000; Dpto. Puno, Peru.

this group probably A. 200 yds. S. of the 3 was group 5, + 200 yds. further S. another 5 (on atop rock knoll). One of latter groups probably C. Indians in area have caused movements groups from usual territories. 1:10, group of 23 in dry grass + bare gray soil area $\frac{1}{4}$ mile SW of Center Knoll. In rest of W. half of S. Pasture, 2 groups 4 + 2 groups of 5. On Upper Ice mdr. a group of at least 7. Went to foot of Ice Lake, about 200 yds. from group on Upper Ice mdr. Only 7, no juveniles. They stood + looked down canyon, then filed up the slope, 4 or more defecated in turn on one pile, then on up their draw, total move at least 200 yds. (1:50). What happened to the 2 young which were in band a few weeks ago? At 2:40 the 3 of A group as before. Returned to House. 5:20, calm, a few snowflakes - the 3 of A about 100 yds. W. of Rock Shelter; the 3 of B about 250 yds. NNN of House, at foot slope below foot Long mdr.; ^{a single} ~~one~~ ~~fox~~ about 300 yds. N. of House. Two black alpacas walked toward B; group suddenly saw them 50 yds. away + ^{ran a} ~~ran~~ a few steps together, then watched as alpacas passed. ~~One fox~~ ^{The single} walked 50 yds. ~~two~~ toward alpacas, defec. on pile, then another 100' toward them (to 50 yds.), then grazed 50 yds. from B. ^{The single (one fox?)} ~~One fox~~ whistled at one, 200 yds. away. At this all of B raised heads + looked at whistler, but 10 seconds later they continued grazing.

September 5, 1951. at 6:¹⁰~~30~~ a.m. I was at Rock Shelter. Clear, fair breeze. The 3 of group A were grazing 200 yds. up Long mdr. Group B, 4, about 100 yds. W. of where last seen last evening, on lower slopes below foot of Long mdr. At 6:25 or lay prone in grass of hillside.

Vicugna

September 7, 1951.

Aricomia, 15000', Depto. Puno, Peru

at 6:30 a.m., clear, light snow on ground, I visited rock shelter. Group B, 4, 150 yds. to NNW. Group A, 3, ²⁵⁰~~200~~ yds. W. Group C, 5, 1/4 mile WSW on lowest slopes S. Hill. Returned at 7:15. Then Group C was 100 yds. down slope on gentle slope of green mat. B had moved 50 yds. W. across slope to gentle slope of green mat. A had moved 100 yds. down canyon. Fog obscured vision. Left, returned 8:45. The 3 groups about as before, A + B about 150 yds. apart, A ad. ♀ prone. Lone Joe grazed 200 yds. ENE of House. 9/10 stunted & low cumulus. No livestock yet in S. Ponds area today. 8:50, C moving up onto steeper dryer slope; one defec., one rolled then shook head. Within 15 seconds 3 of C rolled, at different spots on grassy slope. all up, then all 3 rolled again. One shook after standing. One slid down slope a few feet as thrashed. None turned over dorsally. Only ^{visible} 4 in group C now. Group B within 15' diameter; A spread 50 yds. Snow entirely melted now. 9:09, A ♀ up, walked 50' to near imm., started to graze. 9:16, ad. ♂ of B lay on side, raised neck up when baying sheep poured onto S. Ponds Flat, then lay neck on ground again. 9:24, imm. ^B walked 50' up slope, nosed pile, worked ^{fore} feet on, spread hind legs & put tail up, defec., squatted deeper & urinated. ♂ up, & all others walked toward pile. ♂ ran last few steps to pile 20' from where imm. went, then defec. The ad. ♀♀ moved & defec. & urinated on same pile as imm. Then all grazed on dry grass slope, ♂ 50' up & across slope from others. ^{9:40}~~10:40~~ B imm. defec. 9:45, group 5 (no young) crossed over to this side S. Ridge near middle Indian marker. 10 a.m., one of B was prone. One of B whistled as Indian women appeared 200 yds. down canyon. Prone rose, all walked up canyon leaving 100 yds. or more ahead. Group A moved up canyon though 300 yds. from woman, but 1 stopped to defecate & all halted

Vicugna

September 7, 1951.

Ariconia, 15000' Depto. Puno, Peru

at that spot until woman 100 yds. away. Then A on up canyon to top of low rock knoll, then across meadow to S., running, when woman 100 yds. away (across her path). B moved 200 yds. across + slightly up slope, ahead of woman, then ascended dirt + rock slides of S. Hill about 75 yds. B grazed there on steep slope, 75 yds. from the S which had come over S. Ridge (came 10:10). No stock in long mdiv. Fair breeze up the canyon. Sky 8/10 cumulus; not cold. B among flat rocks, sparse bunches brown grass, + sparse tula - apparently finding little to eat, + climbing higher altho woman long gone out of sight up canyon. 10:20, of 5 group, 4 prone on levelish area of rocky sidehill, other standing near - a fifth on ledge 20' above them. Of B, one thrashed on side on dust of sidehill, + one lay prone. Then ad. ♀ + ♂ climbed rough nearly pure rock steep slope until 20' higher than min. (10:25), then even higher - about 150 yds. up from foot of slides + continuous grass. Here the two adults lay prone. 10:28, two came over S. Ridge near Lower Indian Marker + walked up canyon along sidehill. The two ran across + down slope, then S. across long mdiv. One ^(not of B) chased the S across + down slope, its tail high, for 50 yds., then they walked on down across slides (100 yds. below B) to foot slides (Pycnophyllum area). Four defecated at same time, posterior ends a semi-circle around a single pile. 10:35, min. B ascended to 20' from adults + lay prone. 10:40, 20 llamas came up onto foot of Long mdiv. 10:53, one of B up - all 3 by 10:58. B grazed near rocks + tall bunches dry grass. One prone again 11:05. ~~Indians~~ - 11:30, B even higher on slope. Man rode up canyon on horse. 3 p.m., none seen from Rock Shd.

September 8, 1951. 7 a.m. I at Rock Shelter. Clear, calm. B, 3, 150 yds. NW, grazing on mat. A, 150 yds. up canyon from B. 2 of A grazing, other (♂?) 200 yds. further up canyon at

Vicugna

September 8, 1951

Aricoma, 15000; Depto. Puno, Peru.

edge mat looking at C, 6, grazing 100 yds. beyond. A07 slowly walked back to near its group. No stock this early - or later today. I went up canyon to trap line. Group of 5 at 7:30 about 300 yds. up Long Mdw. from 6 of C. at 8 a.m., overlooking S. Pasture, saw group 3+ in center of E. half of S. P., also 1+3, Center Knoll, 4+1 + 20± horses + 6 (~~high~~ high to W.). In Upper Ice Mdw. a group of 7, + 6 (1 or 2 young!) about 200 yds. S. of Ice Lake. This group retreated 100 yds. uphill when I was 600 yds. away. The 5 group I came upon, 100 yds. away, on side of S. Hill. They were downwind from me but did not take alarm until I came over a rise, then they ran uphill. In alarm, always go uphill. || At 3 p.m., group C, saw 5, where first seen this morning, + A at its same site too. I walked toward C. from S. + the group went to foot S. Hill, then ascended, keeping about 150 yds. from me. Only 1, apparent ♂, squealed at me. I ascended slope + again came on them when one (♂?) walked out to edge of rock outcropping which overlooked me, then group ran across + down slope ahead of me. Group of 6 again 200 yds. S. of Ice Lake on grassy (brown) slope near rock outcroppings; apparently 2 young. 600 yds. from me they retreated 100 yds. across + up slope + 1 or more rolled.

September 9, 1951. About 6:30 a.m., the 6 grazing 300 yds. S. of Ice Lake about where last seen last evening. Now on Upper Ice Mdw., but on highest trails on shale slide above a green meadow 1/4 mile WSW of Ice Lake, a group of

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1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

Vicugna

September 9, 1951

Aricoma, 15000', Depto. Puno, Peru.

7, one standing + 6 prone on 2 parallel trails, at least 200 yds. up slides from nearest vegetation (evidently Upper Ice Mdw. group, probably alarmed last evening). The 6 prone on slope 20 minutes +. Three seen 6:45 on Ice Mdw. (2 or 3 last evening). Then crossed southward and ascended slope. Returning down canyon I saw A, 3, near green mat 400 yds. up Long Mdw. from Rock Shelter. At 1 p.m. there 3 near same place, + 5 (group C?) 200 yds. further up Long Mdw. // Drove to Crucero, departing 8 a.m. 8:15, a group of 8 ~~was~~ including 2 or 3 young about 200 yds. E. of Summit. On E. side road, group of 5 ± on green flat near head of Lake Aricoma. Noted none near foot Lake A. Halfway down to Crucero plain saw groups 4 (ort, 1 young), then groups 5 + 6, each with 1 young. Between junction Potos - Crucero road + Crucero, group 4 (1 young) seen. Returning about noon, saw 7 + 6 near foot Lake A. on plain. ~~High~~ High proportion young in Crucero valley - because Andians do not molest them? - milder weather + fewer foxes?

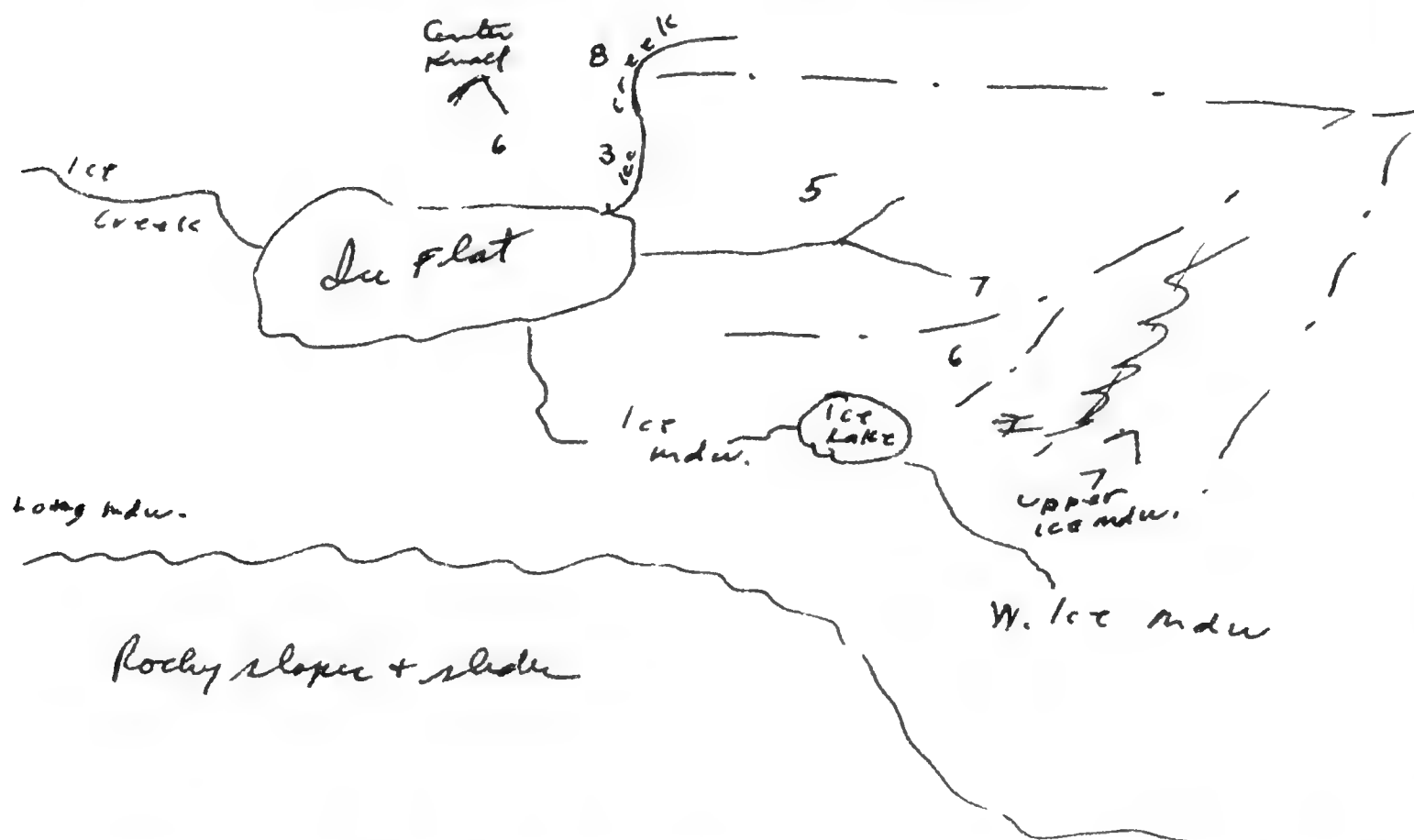
September 10, 1951. At 7:40 a.m., A, 3, on green mat 400 yds. up Long Mdw. from Rock Shelter, + C, 5, 200 yds. farther up. C, disturbed by me, went up slope of S. Hill. No stock seen in S. Basin today. 8 a.m.; there is a draw W. of Ice Flat, with fork 1/4 mile up from flat. Group of 5 on the S. fork, 7 on the N. fork (5 prone on dry moderate slope). Group of 6 about 300 yds. S. of Ice Lake on low rock outcroppings. Group of 7 on Upper Ice Mdw. near the central rock knoll. The 6 ~~seems to have~~ ^{have} but one young of the year, the 7 none. These groups about same at 9 a.m. Two at ft. Ice Mdw. squealed at me + went southward over rocky hills.

Vicugna

September 10, 1951.

Aricoma, 15000', Depto. Puno, Peru.

Watched the 5A14 especially. 9:22, they moved slowly 50 yds. to E. to flatish area of few rocks, brown grass. apparent ♂ higher on hill than others + more vigilant - but young + a ♀ led toward the grass. I watched from about 600 yds. with 'scope. ♂ ♀ of 6 prone on grass. (1 of the 7, on green sloping mat, also prone). 6/10 curvilinear; fair breeze up canyon. 9:26, one of 6 lay on side on grass - up by 9:30. 9:35, the apparent ♂ pushed neck on ground, then down on side, thrashed 4x, lying neck dorsally along ground, then remained lying on side with neck on ground. 9:39, ♂ rolled, then rose. Other prone or up + shook. Young had grazed up to 50' from nearest other. Young walked 50'; rolled + lay on side. 3 of 6 lying on side by 9:42. 9:44, all up - at attention + looking NW (not toward me) + I heard faint warning whistle. ♂, from 100' away, joined others. Then (9:45) all grazed. 9:47, young on prone - ^{all} others within 20' of it. Young up before 9:53. All 6 grazed. Just W. + NW. of Center Knoll, S. Pasture, groups of 6, 3, + 8.



10:15, one (♂?) of 7 on upper ice mdw. was 50 yds. up slope from

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September 10, 1951.

Ariconia, 15000', Dpto. Puno, Peru.

group + looking uphill at ? One (or ?) of 5A1K grazed 50 yds. uphill from others. A lone one appeared 100 yds. N. of Lee Lake, whistled at me (250 yds.), then lay prone on ridge. 10:22, young of 6 nursed from ♀ for 1 or 2 minutes, then the 2 grazed side by side. This group 100 yds. SW of Lee Lake, now on green mat. The separate one of 7 still up slope 10:30; a fox ran across hill 100 yds. from it. The one (or ?) ran 10 yds. toward fox, stopped + watched, returned to group 3 minutes later. Occasional snuffles; 8/10 overcast. // 1:10 p.m., the 5 of C were near site of this morning but 50 yds. up slope of S. Hill. They walked up slope at my approach, + about 1:20 I saw 1 at edge of rock out-cropping 200 yds. up the slope from me (slide + rocks). 2:30, group A₁ 3, about 150 yds. W. of Rock Shelter + I was coming down Long Mtn. The group moved 100 yds. down the draw into B upper territory, then up slope of S. Ridge + some defec. on a B pile, then all up canyon (I on opposite side) along sidehill toward SW. end of A territory. Fog obscured parts of S. Basin at times. // 5 p.m., 3 on upper B territory on green mat. A hoarse cry at me, 300 yds. across the canyon.

Sept. 11, 1951 — Inant p. 194 —

on back as if had rolled on mud. One prone 7:30-7:40, then up. One of groups whistled 4x + all looked at a point below me, then back to grazing in 2 minutes. 7:46, young nursed 2½ minutes. Stood L. side adult (usually grazed near) at 45° angle, ears back + head vertical beneath abdomen. Occasionally pushed nose up hard. ♀ stood quietly, chewing cud + finally turned to

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September 10, 1951

Aricoma, 15000', Dpto. Puno, Perú

Aricoma, 15000', Dpto. Puno, Perú

food not eaten; perhaps gave wrong kind of Amoxic. Watched vicuñas near Ice Lake 9-10:30 a.m. 8/10 overcast by 11 am + for rest of day. Occasional snowflakes. Fog in S. Basin in afternoon. Picked up most of traps + set others so that 32 total bait (no steel, 4 line). Max. temp. +14°C.

September 11, 1951. Min. temp. last night - 1°C. No fog overcast 6 a.m., totally 7 a.m., cumulo-stratus. At Rock Shelter, 5:55 a.m., saw group B, 3, grazing 50 yds. from crest S. Ridge, 200 yds. N. of R.S. Group A, 2 seen, on bottom of Long Mdw. draw about 250 yds. W. of R.S. Group C where seen first last 2^{or 3} mornings; I did not pass closer than 250 yds. but they went 100 yds. across Long Mdw. + 50 yds. up slope of S. Hill. A single one about 200 yds. further up Long Mdw. (head). It went 75 yds. up rocks + slides of S. Hill. Two in Ice Mdw.; these called + went S. over rocky knolls. The 6 (6:30 a.m.) were 100 yds. SSW of Ice Lake. The 7 near head of a green slope above + 300 yds. W. of the central knoll of Upper Ice Mdw. all save the lone one as yesterday + as expected. I watched the 6 from 500 yds. - across Ice Lake. They looked toward me + I heard low whistle; then continued grazing, one (prob. ♀) 100' from the others. At least 2, perhaps 3, imm. in the 6, + of course 1 young. By 7:10 no change. I moved to higher + closer watching point. In sneaking across 50 yds. of open ground, drew a whistle from 1 of the 6. 7:25, watching from 400 yds. N. of the group of 6, they on green mat slope or 100 yds. on S. side Ice Lake. The 7 moved S. across slope to among rocks + bunch grass. The green mat they had been on is highest in S. Basin (High Ice Mdw.). One of 6 has gray

Vicugna

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side so feeding broken off. Imm. young walked to R. side then bent & put head back toward it & young did not proceed. Young lay prone, A. ^{wrist} ~~ankle~~ first. shifted both ^{wrists} ~~ankles~~ forward after knees bent. One imm. prone on level part green mat, chewing cud, @ 7:53. The 7 100 yds. off mat on dark gray rock outcrop where occasional bunches grass (brown); 7:55. Of 6, young up 7:57, moved a few yards, then prone on mat - again ankles forward a few inches after head knees down. Then one gave a whistle. Biggest & reddest - ♂ doubtless - ran 50' across slope, then walked up slope 50 yds., occasionally stopping & looking intently up hill (fox?). Moved about 75 yds. up slope & stood atop rock outcrop. 8:03, elder prone up. Two went $\frac{1}{3} + \frac{2}{3}$ ^{way} up hill toward ♂. Young remained prone; rose 8:06. New light breeze up canyon & fog coming up canyon. 8:10, young one prone on level ~~area~~ ^{spot} bare gray soil. ♂ still standing atop rock, ears & head up, staring. Another ♀ prone. 8:15, of the 7, one still out on rocks but 6 back on mat. Perhaps took to rocks because of me - nearly $\frac{1}{2}$ mile distant. ♂ of 6 no longer looks; stands & chews cud. 8:19, ♂ walks down slope toward group. Elder prone ^{than prone again} rose; juv. remains down, forelegs extended in front of body. Range of this group appears to be about 300 x 300 yards - approximately 40 acres. Yesterday 5 vicuñas in area known to Upper La India. & S. to Center Knoll - perhaps 1 square mile; about $\frac{640}{60} = 10$ A./vicuñas. Prob. 54/v. on belt ranges. Of the 6, two (one the muddy one) slightly imm. - perhaps not as young as youngest of B. 8:38, juv. & other prone one up. Juv. to mat, not ♀, & grazes. Juv. has light spot on nostril in front of eyes - as other young have. 8:40, all 7 at top of green mat slope at

Vicugna

September 11, 1951

Aricama, 15000', Depto. Puno, Peru

edge of High Ice Mdw. 8:45, juv. stays adjacent to mother. Latter no reaction when another comes close to juv. on opposite side. Mother lean & thin-necked. 8:52, muddy imm. prone, rt. wrist first, wrists pushed forward before chest down on ground. Sun breaks through clouds; $8/10$ cumulus. Vicuña color protective on brown grass - not on green or dark gray rocks. Prone one had forefeet together & draped over mound in mat. Another grazes as close to juv. as mother. 9:05, other imm. prone. ♂ grazed 50' 100' from nearest of others. 9:13, ♂ walked 50' further across slope to feces pile, defec. (feces visible at 400 yds.!) - then walked back toward gp. Nearest one, prone, rose & ran to group. ♂ lay prone ^{50'} across & up slope from ♀♀ (1 prone still, the muddy imm.). 9:20, the 7 still grazing at top of same ^{green} mat slope. 9:30, the muddy imm. up & grazed. One opened & closed mouth rapidly as it nibbled at inguinal region, then at heel. One scratched foreleg with tip hind toe without lowering head. One of the 7 prone since before 9:20 - still at 9:35. 9:45, ♂ rose & looked up canyon. ♀♀ stopped grazing & looked same direction. About 1 min. later alarm subsided. ♀♀ grazed. ♂ scratched & nibbled various spots, then prone, L. wrist first. Doubled wrists pushed forward 4" on ground as forelegs bent, first L. then R. 9:59, juv. quickly walked 20', bypassing 2 ♀♀, to mother, & nursed $2\frac{1}{2}$ minutes quietly. Mother stood with ears back horizontally. Finally mother turned slowly sideways so feeding broken off. Juv. walked a few feet away & grazed. 10:05, an ad. ♀ prone; not the mother. 10:07, imm. ♀ prone - brushed side head on ground. The 7 as before but all up & grazing. Both ♀♀ on side, neck & head lying on ground. 10:00 $\frac{1}{2}$, second dam rose

Vicugna

September 11, 1951.

Ariconia, 15000', On to Puno

a grazed; first to prone. ^{juv.} ~~OT~~ grazer closer to 3 other ♀♀ than to its mother. Prone ♀ extended ^{fore} leg forward, nibbled at foot, then replaced leg under chest. Chewed cud. 10:15, ~~OT~~ up (down since 9:15), quickly walked 50' toward graze + grazed vigorously 20' from nearest ♀♀. 10:20, the 7 still at top green mat slope, 1 prone. // The mother walked 25 yds. across slope to rivulet + drank, 3x, 5-9 sec. per drink, head up between. Another joined it. Juv. pruned that way but stopped at feces pile + defec. (prob. ♀). Then imm. ♀ which had waited its turn. Then 2 other ♀♀ - ^{apparently} ~~perhaps~~ all graze except OT + mother defer. All now about 100 yds. WSW of the Lake near inlet, about 150 yds. from 7 a.m. position. ♀♀ walked toward OT. Mother stopped at feces pile + defec. Mother has slight bulge at sides - pregnant tho nursing? 10:30, an ad. ♀ prone + chewing cud. 10:25 - ⁶ For the ^{OT} ♀♀, only ^{the OT} this one defec. since 7 a.m. or earlier, 3 hr. ^{15 min.} ~~5 min.~~ 10:40, juv. rolled on green mat + remained prone. 10:42, muddy one prone - brushed chin + sides head back + forth (sideways) on mat. Yawned, muzzle high. // 10:45, the 7 had moved 50 yds. S. across the mat; 3 on upper flat, 1 prone on bare soil slope. // The muddy one for 10+ min. with one leg out straight in front of body. 10:54, another ^{imm.} ♀ prone (OT + ^{ad.} ♀ still up). One ♀ redder + thicker necked than others; confusable with OT. 11:01, ad. ♀ prone, so all but OT prone in 50' diameter. 11:07, juv. lay on side for a minute. 11:10, the next to last down (imm. ♀) rose when OT drew near (20'); grazed. An ad. ♀ rose too. ^{This ad. ♀} ~~another~~ lay on side + thrashed; then lay prone again, so 4 of 6 down (11:15). // The 7 have again moved to S. off of mat onto rocky slope. // 11:17, imm. prone - so 5 down. Muddy imm. does not rise tho OT 5' from it. 10:11:20, this ♀ up when OT 10'

September 11 - 5414 - #1 Ice Lake - 7 a.m. - 12 m.

| | ♂ | D ♀ | mother
L ♀ | muddy
D imm. | L. im. | Juv. | ♀? ♀ |
|---|-----------------|--------------------------------------|------------------|------------------------------------|--|--|--|
| Prone
(if up
≤ 3 min.
counted
down) | 9:15 -
10:15 | 10:05 -
10:20
11:01 -
11:32 | 10:30 -
11:32 | 8:52 -
9:30
10:42 -
11:20 | 9:05 -
9:15
<u>10:07 -
10:08 1/2</u>
10:54 -
11:10
11:17 -
11:27 | 7:49 -
8:06
8:10 -
8:38
10:40 -
11:27 | 7:30 -
7:40
7:35 -
8:03
8:15 -
8:38 |
| Defec. | 9:13
11:32 | 10:22
11:40 | 10:25
11:42 | 10:22
11:38 | 10:22 | 10:20 | |

Drink 11:35 10:20? 10:20 10:20? 10:20? NO

Nursed

x

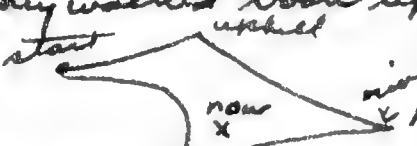
x
7:46 for 2 1/2 min.
9:59 for 2 1/2 min.

Av. ♀ (not juv.)
11x total, 10-62⁷⁰
min., ave. per
♀ (of 4) 2 3/4x,
for av. 25 1/2 min.

Vicugna

September 11, 1951.

Ariconia, 15000', Depto. Puno, Per

rest; walks quickly 5 yds. + grazes. // 11:25, of the 7, one grazing on edge mat, 2 prone on bare soil, 1 prone on rock 100 yds. S. of mat, others? // 11:27, the juv. + prone imm. up + grazed m. ♂. Juv. did not approach mother. Non-muddy imm. twice gave a start when ♂ 10' from it, then chased it 5 yds. in half circle. Prone mother lay on side + threaded, then prone again. 11:32, other prone one rose, then mother, + both grazed. ♂ defec. on feces pile - same as ♀♀ had used. 11:35, ♂ walked 30' to inlet rivulet, drank twice - 8 sec., 8 sec. with head up, then 14 sec., then walked back toward group (moved away from ♂ a few steps). 11:38, muddy imm. worked feet out + moved another pile - in so gas doing got 5' from rear of an ad. ♀ + latter turned quickly as if to spit. Both stood stiffly + imm. defecated. The dark ^{ad.} ♀ then defec. same pile. Other imm. def. + ur. same pile 11:42. The turning around + assuming anus-downhill stance occurs after forefeet are worked on pile. // At 11:45 the 7 were 300 yds. downhill from last position, on upper La Mdu. just NE of the central rocky island. There grazed in a line, 2-5 yds. apart. // Three of the 6 (juv., mother, muddy imm.) worked about 20 yds. down slope from others, to within 50' of edge of lake. at noon they walked back up to others. Range in 5 hours was shaped  about 150 yds. yds. greatest length (5). // 12:30, group C + 1 was 50 yds. up slope S. Hill above green mat 400 yds. up Long Mdu. from Rock shelter, + A, 3, was 100 yds. down canyon from them. B not discovered from Rock shelter. // 5 p.m., from Rock shelter saw group A 200 yds. W. in Long Mdu.

Vicugna

September 12, 1951.

Aricoma, 15000', Dpto. Puno, Peru

Light snow on ground & overcast. 6:30 a.m., groups A about where seen last evening; group B not apparent from rock shelter. at 8:20, group B, 4 (1 imm) came over S. ridge near Lower Indian Marker and descended 50 yds. to green mat - apparently they spent night on N. side of S. ridge. I walked up Long Mdw. but did not encounter C. At 9 a.m. I saw the 5A1X 100 yds. SSW of Ice Lake & the 7 in Upper Ice Mdw., 100 yds. N. of central rock knoll. A single near foot of Ice Lake called at me again & again for 5 minutes as I examined traps at end of line. The calling apparently alarmed the 5A1X & they started up slope (they had not fled when I at traps two previous days). By time I reached my watching spot of yesterday, the 6 had gone 100 yds. up the slope to end of a grassy arm. One proceeded 50 yds. up the rock ^{outcrops} ~~outcrops~~ beyond & other 5 (incl. juv.) grazed (I all hidden but head & about 700 yds. distant. High overcast & snowing lightly tho not very cold. 9:50, juv. nursed 2 min. at left side of mother. Groups mostly hidden then by rocks. Light breeze from W. 10:02, ^{all 6} ~~4 of 6~~ visible. One ♀ defec. on feces pile. Muddy looked one of yesterday still muddy - a cat would be clean by now. Grazing on short brown grass area & among low rocks. || The 7 about 50 yds. N. of central knoll, all on grass & grazing. || 10:15, one of 6 defec. on pile 100' from other. Can only see 2 or 3 much of time so record incomplete. By 10:30, two grazing, 1 prone on rock, 3-?. || The 7 grazed about 50' NE of the central knoll. || 10:33, one of grazers prone. 10:37, 1st. prone up (prob. ♂), ran & walked & ran 100' to feces pile, defecated, then walked up onto rock prominence. Other prone up too. The apparent ♂ seemed to be looking at something

Vicuña

September 12, 1951.

Ariconia, 15000'; Depto. Puno, Peru.

down the slope. // 10:45, at least 2 of the 7 prone, 4 grazing. // 10:45, a group of 4 walked across slope heading S. 50 yds. ^{uphill} from the ♂ of 6; ♂ stood atop rocks & watched. Two others appeared downhill from ♂ & one of 4 ran down & chased 1 of the two. The ♂ of 6 ran 100' & stood, tail up, between the attacking one & the other 2. 5 of the 6 grazed together 100 yds. N. of the ♂, paying no apparent attention. 10:53, the ♂ walked, then ran, back to 50' from its ♀♀, leaving at least 4 scattered on slope above. 10:55, the ♂ walked steadily across slope (to SE) 50+ yds, out of my sight - toward other vicuñas? The 5 ♀ walked 50 yds. down the shallow draw they had ascended at 9:30. ♂ returned 10:58 & stood atop rocks above ♀♀. The ♀♀ grazed among rocks & on dry short grass. // A single, looking like ♂ ad., walked to a small near outlet of Ice Lake & lay prone. Probably same or squealed so much at me at 9-9:30. Gone by 11:05. The 7 now 50 yds. W. of central knoll, grazing together. // ♂ of 6 took another walk off into rocks & returned to group 11:11; all 6 within 20 yd. diameter. // Group of 4 had reformed 150 yds. up the slope from 6. // Feeding ^{among} in broken rocks at edge rock outcrop - as much as ^{area of} single rather than on adjacent unbroken short dry grass. ~~Neither~~ // Neither vicuñas nor storks in S. Pasture; probably horses driven out because of snow. This activity may have displaced C. // a few snowflakes; all overcast. 11:20, 2 prone on level short grass just up 2 min. later. All went behind rock prominence ^{out of my sight,} except ♂. ♂ defec. on pile, then grazed - still only ♂ visible 11:30 // Of the 7, 1 prone & 6 grazing 11:30. I departed. At 12:00, the 3 of A on slope of S. Ridge about 50 yds. from where at 8:20 a.m., near middle Indian marker, & another group of at least 3

Vicugna

September 12, 1951

Aricoma, 15000', Dpto. Puno, Peru

(B?) about 200 yds. further down ridge near crest. Sheep again in S. Ponds area.

September 13, 1951. 6:15 a.m., Low fac 300 yds. S. of Hares - it squealed at me at 200 yds. & ran uphill. At least 3 on crest of S. Ridge just above Lower Indian Marker. // 7 a.m., group B, 4, on green mat 50 yds. S. of Lower Indian Marker, & A, 3, 150 yds. up Long Mdw. & at lower level. I walked up Long Mdw. but did not encounter C. Above Ice Falls a group of 5. At 7:30 I saw the 5 A1Y 100 yds. SW of Ice Lake. The lone one 100 yds. N. of Ice Lake started sneezing at 300 yds. I stalked to a knoll just NE of the lake to watch 5 A1Y. The lone one lay prone 150 yds. N. of Lake & sneezed periodically, keeping the ♂ and dark ♀ of 6 alarmed. These 2 ascended 50-100' up slope from other 4 & stood watchfully during the sneezing. I was 400 yds. away, mostly hidden among rocks, but clearly visible to the lone one. Started watching 7:55. 8:12, the 4 ♀♀ up by two eldest, then all slowly on up the slope together. 8:16, juv. to pile, def. & ur., - sure ♀. Then juv. urined 2 1/2 min. (8:18 -) at left side L. ♀. First half of time juv. occas. lifted one foreleg & rest on ground, & every 3-5 sec. pushed its muzzle up sharply, then slowly drew it down 6" again. The lone one continued to sneeze occasionally; rose at 8:22. // 8:30, 7 starting across rocks going S. from edge High Ice Mdw. // 8:33, all but ♂ of the 6 defec., juv. & 1 ♀ on one pile, others on another. Then all walked slowly on up draw, the same or where retreated yesterday, tho the sneezing lone one was quiet & grazing. 8:45, they were at head of the continuous grass in the draw. Two (♂ + d. in?) defecated briefly on one pile, then all grazed. // 8:50, the 7 were on

Virginia

September 13, 1951. Arrioma, 15000', Depto. Puno, Peru
 Upper Ice Mdw., 300 yds. SW of central knoll, all in bunch among tola, bunch grass, rocks - had moved about 300 yds. horiz. + 100' lower in elev. from High Ice Mdw. The lone one walked to inlet stream of Ice Lake (on W. side) + grazed on green mat. 8:53, the 7 had moved down 50 yds. to edge continuous grass - perhaps they spend night at High Ice Mdw. + descend during day. These 7 about same place, ^{9:10:30} + 50 yds. further downhill ^{9:} 10:50. The 6 at same area ^{9:} 10:30 + ^{9:} 10:50. In draw W. of Ice Flat, near fork, 12, perhaps 2 groups. In S. Pasture a group of 12, several prone, about 200 yds. E. of Center Knoll. No stock in S. Pasture today. || At 10:15, groups A + B in Long Mdw. about 50 yds. apart, to W. of Rock shelter. All overcast. || About 2:30 p.m. went into S. Basin + found group of 3 A + 1 V just over S. Ridge from upper B territory (group O). These somewhat tame, squealed at me at 200 yds. + walked slowly away but not up slope. I walked along foot of S. Hill + found + near foot of green mat sloping down from SW Mdw. Group B, 4, was halfway ^{down} from foot of Long Mdw. toward S. Pardo Flat, 3 prone among rocks on a flattish part of slope. One standing + calling but others remained prone as I passed ¹⁵⁰/₂₀₀ yds. from them. || About 4:30, I saw group of 17 at head of Long Mdw. - prob. 0707.

September 14, 1951. 4" new snow on ground. At 8 a.m. at Rock shelter saw group A, 3 (1 imm.), 350 yds. up Long Mdw. near lone rock outcroppings. No snow on dark rocks. I walked up to near the 3 - at 100 yds. they ran to far ^(N) side of Long Mdw. + up slope. Troops various

Vicugna

September 14, 1951.

Aricoma, 15000; Depto. Puno, Peru

and complicated. Apparent running track was $\rightarrow \cdot \cdot \cdot \cdot \rightarrow$,
 longest step by footprint (?). Another track was double prints
 in even alternation $\infty \infty \infty \infty$ - walking? Many tracks at
 head Long Mdw. - groups seen last evening? Foggy overnight but
 no breeze. At 9 a.m. I saw the Ice Lake groups at same
 spot where first seen yesterday, but now 3 in groups. Tops
 of grass above snow but vicuñas seem to put muzzles down
 through the 2-4" of snow to eat. Do not paw away snow.

At 9:16, one of this group lay prone on snow. One dark adult
 remained 50±' uphill from others. // A lone one walked into sight
 about 75 yds. from me & remained, not seeing me sitting in open,
 until I yelled at it. Then faced me & gave straggly call - mouth
 closed but abdomen pulsed in call - then turned & ran. Two
 others were on Ice Mdw.; they called & fled to S. over rocky
 terrain. In Upper Ice Mdw., a group of 7 about 100 yds.
 N. of central knoll - away from snowless area of the rocks. 9:34,
 this group started to S., group started & ran 5± yds. together, then
 stopped & stared; a fox? Half of them grazed a minute later.
 One defec. on clean snow (pile under?), then another in turn on
 same spot. // Of closer 7, prone rose when I walked a few
 yards. Then all grazed. 10 a.m., I angled somewhat toward
 groups & at 500 yds. distance they looked in my direction. I sat
 quietly. Groups moved slowly across slope. One moved &
 defecated on pile; then 2 others. Led by a large dark adult -
~~probably~~ ♂ - all went across & up slope in ragged
 file at slow walk with occasional stops. 10:10, the
 leader, ♂, stopped & defec. At least 2 others defecated

Kicugno

September 14, 1951

Anconima 15000; D. La Puno

briefly there. Juv. + another merely rained tail on passed the spot. Then all on up slope of same grassy shallow draw where I had seen them retreat on other occasions. Group stayed about 200 yds. uphill from starting point. 10:18, juv. apparently nursed about 3 minutes (partly hidden). One adult spit at another, facing away, 8' away. // 10:20, on Upper Lee Indiv., the 7 150 yds. NNE of central knoll, 2 move on snow (not holes in). Then the 2 up. Overcast but very bright. Wind lines of most black (with mud?). Four defecated, 3 in turn on one spot + other 10' away simultaneously with last. All but 2 of closer 7 hidden in rocks (10:30). I left. At 11 a.m. the closer group had crossed a low rock ridge (100 yds.) to another shallow grassy draw. 11:30 a.m., Rock shelter - no vicinas visible in Long Indiv. // About 3:30 p.m. after cessation of rain, group 0, 4 (1 young) seen 200 yds. SSW of Island Lake - usual spot.

September 15, 1951. at 7:30 a.m., group B, 4, grazed 150 yds. NW of Rock Shelter. Group A, 3, on slope at foot S. ridge 200 yds. up canyon from B. Sunny, calm. || 8:50, I at Ice Mdw. Group of 6 (1 young) at S. shore of Ice Lake. at 400 yds. they faced me, then walked slowly 50 yds. up slope. Stop and here. 8:56, juv. + str. D. imm. prone. Both ~~now~~ ^{rose} quickly when Dad. ♀ walked to 10' from them; then a few steps up slope + both prone again. 9:02, juv. quickly up + 10' to ♀ + moved at left side, feet ♀. Nursed 2 minutes. Then on to feces pile, moved, + defecated. L. imm. defecated 6' away. Juv. walked up behind defecating imm. - latter turned

[57? - prob. absent to 9:38; 64/Jan Sept. 21-23]

Vicuña

September 15, 1951

Arrecoma, 15000', Depto. Puno, Peru.

[Not sure if in land 5415]

head back & spat. Then ~~some~~ juv. defec. where L. imm. had. ♂ then moved this pile & briefly defecated again. Juv. prone 3 yds. from feces pile, then rolled. Then both prone up. D. & ad. defec. same pile as ♂ (9:08). 9:09, juv. again prone. D. imm. to feces pile, moved, defec. at edge. Then had walked 50' W. across slope. D. imm. followed. Juv. dragged side of head across mat, then I gave a thrust dorsally, turned over dorsally, quickly got onto feet & scampered toward others. 9:14, juv. prone on patch grass. 9:30, ♂ prone on mat. Juv. rose 9:31. Juv. nibbled at forefoot on ground but lifted hind off ground θ^+ in nibbling at hoofs. Then juv. grazed. 9:38, the group stood in a close bunch as a group of 7, vigorously chased by another, passed to W. across slope 200 yds. uphill. The one chased one group of 3 \pm , then cut back & chased others, until all were driven $\frac{1}{4}$ mile to Upper Su Mdu. The 6 group started uphill in file, ♂ leading, in their usual shallow retreat draw. The one returned & from chasing the 7 & now followed the 6 which walked fast away, pursuer about 50' from group. They seemed to be driven toward upper part of Upper Su Mdu. at 9:45, about 600 yds. from starting point near lake & still being driven. 9:52, the 6, pursuer 100' behind, were clear across head of Upper Su Mdu. & 50 yds. up on shale & dirt slide, almost unvegetated. Air line about 700 yds. from 9:38 point. The 6 went across & up the slope, to S., the pursuer walking parallel 100' below. One of 6 walked on 50 yds. ahead of rest which loitered at a feces pile & ~~some~~ defecated. The pursuer, 100 yds. behind, defecated at same spot (9:58), then following the 6 up

Vicugna

September 15, 1951.

Aricoma, 15000', Dpto. Puno, Peru

and across slides. // Two at east shore of Ice Lake; one called at me - 300 yds. The usual Ice Mdw. 2? // The 6 at 10 a.m. are 1/2 mile SW + 400' above 9:35 spot, still ascending, juv. in middle of group in file, the pursuer 100' below. // 10:05, the 7 still on Upper Ice Mdw. near E. foot of central knoll, all in 50' diameter + grazing - probably usual 7 here which somehow had been displaced into draw west of Ice Flat (man?). // 10:10, pursuer had ascended no further, the 6 on steep rock slopes (some tall bunch grass) 100 yds. uphill from it. 10:12, the pursuer 50 yds. toward 6, running part of way, + the 6 climbed higher on the rocks (mostly solid outcroppings, slides between). 10:20, group another 100' (vertically) higher, pursuer 50 yds. from 6. At times pursuer had been within 10 yds. of one of group but no fight or chase. 10:30, the 6, still followed, heading NW about 300 yds. down rock slides from highest crest of ridges of the divide - apparently no vegetation this high, about 300' above base of High Ice Mdw. 10:40, the 6 + 1 together as one group walking over rough sand boulders (probably will go to High Ice Mdw. Hind legs seem stiff in descending rock faces. // 7/10 cumulus but occasional sunshine. Fair breeze up canyon. 7 still on Upper Ice Mdw., about 200 yds. N. of central knoll. // Same 11 a.m.

September 16, 1951.

Dpto. Puno
Nr. Lake Aricoma, 14000',

About Noon, halfway down slope from lake toward Cuzco, saw group of 11 (1 sure, probably 2 young - the 6 + 5 seen several days ago?).
Aricoma, 15000', Dpto. Puno
September 19, 1951. About 5 p.m. saw 6A1Y in

Vicugna

September 19, 1951. Ariconia, 15000', Dpto. Puno Loop. They paid little attention to car passing 50 yds. away (only 1 looked). Several cattle 200 yds. away, at foot slope below foot Long mdr., ^{B?} + grazing. Mary said 3 had been to SW of House 200+ yds. part of the day (A?).

September 20, 1951. At 8 a.m., 5 near House (200 yds. N.) at 8 a.m. (B?), then alpacas + sheeps invaded the area. At 5 p.m., after stock left, 4 (prob. B) on S. Ridge near crest to N. of House. From Rock Shelter ~~did not see~~ ^{saw} but 4 (or +) on green mat 1/4 mile up Long mdr. (C^{A?}?).

September 21, 1951. 7 a.m., clear, calm. Group B, 4, on slope below foot Long mdr. (1 yrling still). Group A(?), 3 or +, on green mat 400 yds. up Long mdr. from Rock Shelter. B squealed at me at 200 yds., moved 50 yds. away quickly, + grazed. 6± cattle on Long mdr. between B + other groups. || At 11 a.m., group B, 4, on green mat slope 250 yds. NW of Rock Shelter, + group A, 3, 300 yds. up Long mdr. on same slope. Same at 1 p.m. but 3 more 50 yds. uphill from A. ^{1:30,} At Ice Lake, group of 6 ⁷ 400 yds. S. of lake up usual shallow retreat draws, young one still present. Upper Ice mdr. group - ? At 3 p.m. this group same. Three at foot of Upper Ice mdr. At least 5 (the 7?) on Upper Ice mdr. 300 yds. uphill from central knoll. Lone one 100 yds. N. Ice Lake squealed at me, 300 yds. away, walked 50 yds. toward me, then away again + grazed. At 3:20, group B, 4, near crest S. Ridge near Lower Indian Marker, + A, 3, on green

Vicugna

September 21, 1951. Aricoma, 15000', Dpto. Puno
 mat (1 prong), 100 yds. up ^{meadow} draw + downhill from B. // The morning about 8 a.m. saw 4 about 200 yds. S. of Ice Creek on slope of SE Canyon (also 4 p.m. last evening), 4 13 (or +) up east slope of SE Canyon 1/4 mile from flat basal plain. 5:30 p.m., group B about 200 yds. across slope to NE near top of S. Ridge.

September 22, 1951. 6:30 a.m., group B, 4, 100 yds. from crest of S. Ridge on N. side, N. of Rock Shelter, one prong. Another 2 were at NE end of S. Ponds Flat + ascending S. Ridge. at 7 a.m. these 6 gone - over to N. side ridge? 8 a.m., group A on sidehill 400 yds. up Long Mdw. from Rock Shelter. A group of 6 (group C probably) 200 yds. further SW on same slope. The two apparent ♂♂ retiring from ^{each} other toward their groups. In walking I encountered 3 - apparently young ♂♂ - about 300 yds. SSE of the C group, + these 3 frightened up slope toward C. The C ♂ came 100 yds. toward them + showed them briefly. The 3 went toward A whose ♂_(?) rejoined toward the other 2 of group A. // 8:15, near foot Long Mdw. a group of 8 seen 200 yds. NE of Ice Falls. The usual single 100 yds. N. of Ice Lake. Group of 7 (1 young) 1/4 mile S. of Ice Lake near head of usual retreat draw. As I watched from 1/2 mile away, the 7 walked 200 yds. up to head of draw, 3 or + defecated, then the group climbed onto rocks. 100 yds. uphill from the 7 was group ^{of 7} ~~6 (or +?)~~ on rocks (the Upper Ice Mdw. group?). None visible on (Upper Ice Mdw. or slope leading to high Ice Mdw. Then same 8:30. Another group 7 or + (the B?) was filing S. over rocks 300 yds. SSE of the Ice Lake 7; 1/4 mile

Vicugna

September 22, 1951.

Aricoma, 15000', Depto. Puno, Peru.

W. of Ice Falls. 8:40, leading 4 of this & chased fast to SE by another with tail up (head of draw to WSW of Ice Flat). At 9:30, the Ice Lake CAIX as before but group uphill from them out of sight. 9:45, the 6 of group C stood quietly while I walked down canyon 150 yds. from them. They about same place as 8 a.m. Group A 300 yds. down canyon from C, all 3 prone, each 50' from other, ♂ highest, at 9:50 a.m. ♂ up 9:53 & grazed; the imm. up & grazed 9:55. These 3 not alarmed by me in open 200 yds. away. The C group has no imm. as young as in A or B. 5 of C graze on slope while one, ♂?, walks about on slope (once defecated) 50 yds. uphill from them. By 10:05, the C ♂ 150 yds. up & across slope from the 5 presumed ♀♀, again defec. briefly & walked on to SW across the slope at foot fine rock slide. 10:07, 4 of 5 C ♀♀ prone on flattened bare ground at top of rock outcrop, all chewing cud. By ^{10:12,} 10:12, all 5 prone, & the ♂ 200 yds. distant (50' higher level) at top rock outcrop. 10:15, A ♀ still prone. A group of 5 at NE end of S. Ponds Flat, all grazing. 10:24, C ♂ prone 200 yds. from ♀♀. A ♀ up. A ♂ & ♀ defecated simultaneously on piles 25 yds. apart. A group of 6 came over crest S. Ridge near Lower Indian Market & grazed 200 yds. up & across slope from A. At least 3 imm. in this group but no juveniles (young of 1950/1951). 10:46, C ♂(?) up & to-?, the 5 ♀♀(?) still prone as before. 10:50, A ♂ prone. 3 of the 5 prone C's up, then a fourth. The last rolled, then rose, & all walked 30' to graze on brown grass slope. The lone separate one did not return by 11:00 a.m. A. A ♂ up 10:57 & the 3 grazed within 5 yd. diameter. The 6 up slope from them grazed 100 yds. away.

Vicugna

September 22, 1951.

Aricornia, 15000', Dpto. Pong Percu.

Then I came over S. ridge near the G. The groups ^{were} somewhat antagonistic but no chasing. An antelope humul ran up crest of ridge 50 yds. from them. Then the 4+6 ran up ridge. The 4 ^{led} and ascended the dirt + rock slides of S. Hill. The 6 continued across slope up Long Mdw. toward C. a black dog appeared where the 4+6 had been. A run away from dog when it was 100 yds. away. Dog went back over ridge. The C group started away across slope as the 6 approached. a sixth from downhill (the one which had walked away?) joined them so 6 in C. all this action over by 11:05. The A group had moved only 50 yds., downhill - came at 11:10 but looking toward spot where dog had been. No cumulus + fair wind up canyon 11 a.m. 10:15, unim. + ♀(?) of A group + other grazed. At 5:30 p.m., group B, 4, grazed near foot slope below foot Long Mdw.

September 23, 1951. B within 100 yds. (up slope) of last evening point at 6 a.m. At 7:30, B on upper grass mat 200 yds. NW of Rock Shelter, A, 3, 300 yds. up Long Mdw. from B, + C, 6, 1/4 mile farther up canyon. C driven out by my approach. 8 a.m. one group 6 on Ice Flat near center, another 6 (C?) 100 yds. uphill from Ice Falls. The Ice Lake 7 was 50 yds. S. of lake at 8:15 but disturbed by me (+ family) at 500 yds. + walked 1/4 mile up slope in usual shallow retreat draw. Seven on Upper Ice Mdw. 100 yds. NE of central knoll, but at shouting of half (3 yrs.) 600 yds. away the 6 groups moved away. at 10:30, group A about same place as at 7:30. Stock in Haun area

Vicugna

September 23, 1951.

Ariconia, 15000' Dpto. Puno, Peru

today. || The lone one seen at Ice Lake outlet about 9:30 a.m.

About 6 a.m., Lone Joe at E. edge of S. Ponds Flat. || at

5:30 p.m., A, 3, 250 yds. W. of Rock Shelter in Long Mdw.

September 24, 1951. At 5:35 a.m., seen on highest peaks.

5:40, group B, 4, prone on S. side S. Ridge, 50 yds. from crest, near

NE end of S. Ponds Flat. Horseman rode up flat 5:35. One adult

of B rose, then down again (6:45). From Rock Shelter A not obvious.

Frost on backs of the 4. Sun. warmed 3x in 1 minute. Sun rose

struck group 5:55. 5:59, ♂, then imm. + ♀ rose. ♀ defec., then

♂ to same pile, gave wolf haul, + defecated. Prone ♀ seemed to

spit, came back, at other passing close to it. The group 500 yds.

NNE of Rock Shelter. 6:00, group A, 3, in scrub on nearly flat

ground 350 yds. up Long Mdw. from Rock Shelter. I have not seen them

bedding at this site before. Each 20' from ^{next} other in a line. 6:10, last of

B not yet up but chewing cud. 6:12, last B up + grazing, all 4 within

20' diameter, frost still on backs. 6:20, an adult of A rose, then

imm., then other adult. First to fecal pile, defec. briefly, then imm.

Then 2 to green mat + grazed (3rd. out of sight over rise), B graz-

ing as before (6:20). 7:15, I frightened A down ^{Long} Mdw.

in going to traps. Group passed near house, then

up slopes to SW of House (M.K. report). B grazed in

6 a.m. area. ||

September 24, 1951. A hunter shot one, apparently the

long lone squeaky one near Ice Lake, + gave me
heads + testis. ♂, not old appearing.

September 25, 1951. Before livestock arrived in morn-

ing, Mary saw groups A, B, + C in Long Mdw.

Vicuña

September 25, 1951.

Arriving 15000', Dpto. Puno

In late afternoon I saw A, 3 very tame, 100 yds. S. & SW. of House. Passed me, in open, at 80 yds. distance without alarm. Saw same area yesterday & day before & after stock in Long Mdw.

September 25, 1951. About 8 a.m. Many ^[A] crossed lower Long Mdw. in going to trap line & caused a group of 4, B?, to move from B territory up canyon into A territory. At 10 a.m. I saw this group on green mat 400 yds. up canyon from Rock Shelter. At 11 a.m. I returned to watch them, now nearly at foot of S. Hill. At distance 300 yds. from me, one, then all looked. I sat among rocks & they continued grazing. Clear, fair wind down canyon. 11:07, 2 prone of 4; ^{ad.} ♀ & imm. - ~~Group~~ grazed 20' from one; no reaction. 11:08, a few days ago that llamas lay prone & rolled same as vicuñas, & chewed cud in same figure-8 fashion though chewed initially in one sided chews. 11:12, older prone up, then imm. 1 imm. later, & all 4 grazed. No livestock nearby today. 11:17, one ad. ♀ prone. One, in grazing, rubbed side head on mound of Distichia. 11:33, ^{imm.} ~~second~~ ♀ lay on side 6' from first, gave a dorsal thrash, then remained on side with neck & head on ground. Prone one has forelegs extended in front of body & together from wrists to toes. 11:40, imm. up to prone. Rubbed forefoot. 11:48, the dark ♀, longest prone, rose. Other 2 ♀♀ younger appearing - hard to say if one younger than other. 11:58, prone ♀ up. all 4 grazed, 50' from ♀♀. One ♀ rolled, now, shook body. Left 12:00 - 11 returned 12:55 & the 4 all prone 100' down gentle slope (S.) from last site. In color, adult ♂ & ♀ indistinguishable. One imm. ♀ rests chin & neck on hump of mat. Adult yawning, muzzle high, mouth

Vicugna

September 26, 1951.

Aricon a, 15000', Dpto. Puno, Peru.

open wide. 1:04, all suddenly up + adults ran 30' across slope. No apparent alarm. All 4 grazed. One imm. defec. One yawned. Two imm. indistinguishable now. Grazing now off of green solid mat but ground damp. Apparent ♂ loped 50' behind others + prone at 1:09, yawned. 1:23, ♂ up + grazed, all 4 in line in 50' distance. 1:26, ^{ad. ♀} ~~imm.~~ lay on side, neck + head down, on short grass, nearly level ground. 1:29, prone, then up + shook head, then walked 5 yds. toward others + grazed. 1:31, ♂ took one 10± sec. drink at pool in mat. By 1:40, all grazing on green mat near 10 a.m. site. Imm. walked 3' behind adult; latter put head back + seemed to spit + urinate. Turned head away. 1:50, imm. prone but grazing. 1:53, other imm. prone. ♂ especially looks often to S. down slope where probably a herd of vicuñas. 1:54, ♂ ran 50 yds. down slope, stopped short. ♀♀ retreated 100'. ♂ back 20 yds. toward them, then down slope (out of sight). 1:57, ♂ returning up slope to 100 yds. from ♀♀ (had retreated 50 yds.). Then (2 p.m.) ♂ down slope again. (about 300 yds. SW of group, a group of 5 (C?) climbed up onto slides of S. Hill.) 2:04, a group of 15 ascended slope pursued by the ♂. ♂ stood between them + ♀♀, tail up. The 15 went up slides of S. Hill 100'. ♂ ran back to 30' from its ♀♀. Group of 2 ad. + 1 ^{young} imm. ran E. across slides 75 yds. above the 15 + stopped. (The 15 I had seen earlier coming from 1/4 mile SE of the group of 4). 2:10, the 15, ~~pro~~ nearly all young ♂♂ (or all), stood on ridge hill. One lay prone; one defecated on pile. 3 prone lay 2:14 + another defecated on same pile. Of the 4, 150 yds. from 15, two (imm. + ad. ♀) prone,

Virginia

September 26, 1951. Aricona, 15000', Depto. Puno, Peru
 all (esp. ♂) looking at 15. 2:20, the 2A1Y filed across + gently up slope going W. on faint trail across shale + dirt slider. The leading adult stopped + defec., then young one in turn (squatting more to urinate - ♀ or all young do this?), + third (ad.) walked by side. 2:25, the 15 grazing on slope; 2 of the 4 still prone. 7/10 overcast, cumulus + stratus, + wind up canyon. One of the 15 hest muzzles pointed at head of another, 3' away, for at least a minute as if spitting again + again, + other stood with head facing away. The 15 evidently all ♂♂; of 6± seem to defecate, none took deeper crouch of ♀♀. 2:45, ad. ♀ of 4 up, shake body + dust flur. Imm. up 5± min. earlier. All + grazed in bottom of shallow draw. The 15 grazed, in 100' diameter, slightly higher on slope. 9/10 overcast. 2:50, the ♂ of 4 (probably A, ran with a 4th. one, imm.), walked, then ran toward the 15. At 50' distance a few started to move uphill away from A ♂, then 15 joined in compact group + walked away up + across rock slider heading W. The ♂ remained about 5 yds. behind, occasionally running a few steps + speeding up retreating 15. Only A ♂ had tail up - 45° above horizontal. By 3 p.m. the group had been herded 300 yds. across + 100 yds. up slope. A ♀♀ grazed at same site as when ♂ left. One of 15, shied more vigorously, had tail up. By 3:05, group 50 yds. higher on slope + had cut back 100 yds. to E., ♂ still following + herding not too energetically. 3:08, brief fight between 2 of 15. One dashed chest against side other, then put neck over its neck + bore it to ground. One followed other + tripped its hind legs ^{back to ♀♀.} with neck so leader fell. The A ♂ left the 15 + walked 1

Vicugna

September 26, 1951. Aricoma, 15000', Dpto. Puno, Peru
 One, 100 yds. across slope (to W.) of 15, walked across slope going W. toward prone one 250 yds. distant & 50' higher than the 15. ^{Thione} ~~At~~ stopped 100 yds. from the prone one, atop rock outcrop. The 15 descended 15' to a flattish place & all but 3 lay prone (3:15). A ♂ back with its group (3:17). ^{Three} ~~Two~~ others with the high prone one, ^{so there + lone one probably the 5} ~~probably the 2 ATX seen earlier~~ seen just before 15 appeared, & lone one a ♂ investigating the 15 being driven toward it (perhaps this is why group cut back to W. on slope). 3:29, the 15 had crossed 50 yds. of dirt slide & now descended next to rock outcropping. Some minor fights between pairs. One pursued another down slide & leader heaved ^{falling lay prone; leader turned; wrestled under.} back several times with one hind leg. One rolled in low bush, then in tall dry bunches grass. 3:39, the playful 15 only 200 yds. up & across slope from the grazing 4, ♂ of which stands staring toward group. 3:40, the big group only 100 yds. from the 4, but no attack. Apparently the 15 found some food among rocks & tola, some bunch grass, mixture on slope. The 15 moved ^{west-} ~~east-~~ ward again 200 yds. across & down slope to 2:50 position. At edge of continuous grass slope they grazed diligently. One lay prone (3:50). 3:55, the 15 all up & grazing. 4 p.m., ♂ of the 4 chased the 15, & a ♂ of group of 6 300 yds. further up canyon came to chase group. The two big ♂♂ held tails nearly vertical, necks & ears high. By 4:07, the 15 about at ~~same~~ ^{same} spot. Individuals & groups chased. One of big ♂♂ would go off after 1 or 2 out of main group & chase them back to group, but sometimes the 2 big ♂♂ on opposite sides of a group so there prevented from running to main group - no coordination (or animosity) be-

Vicugna

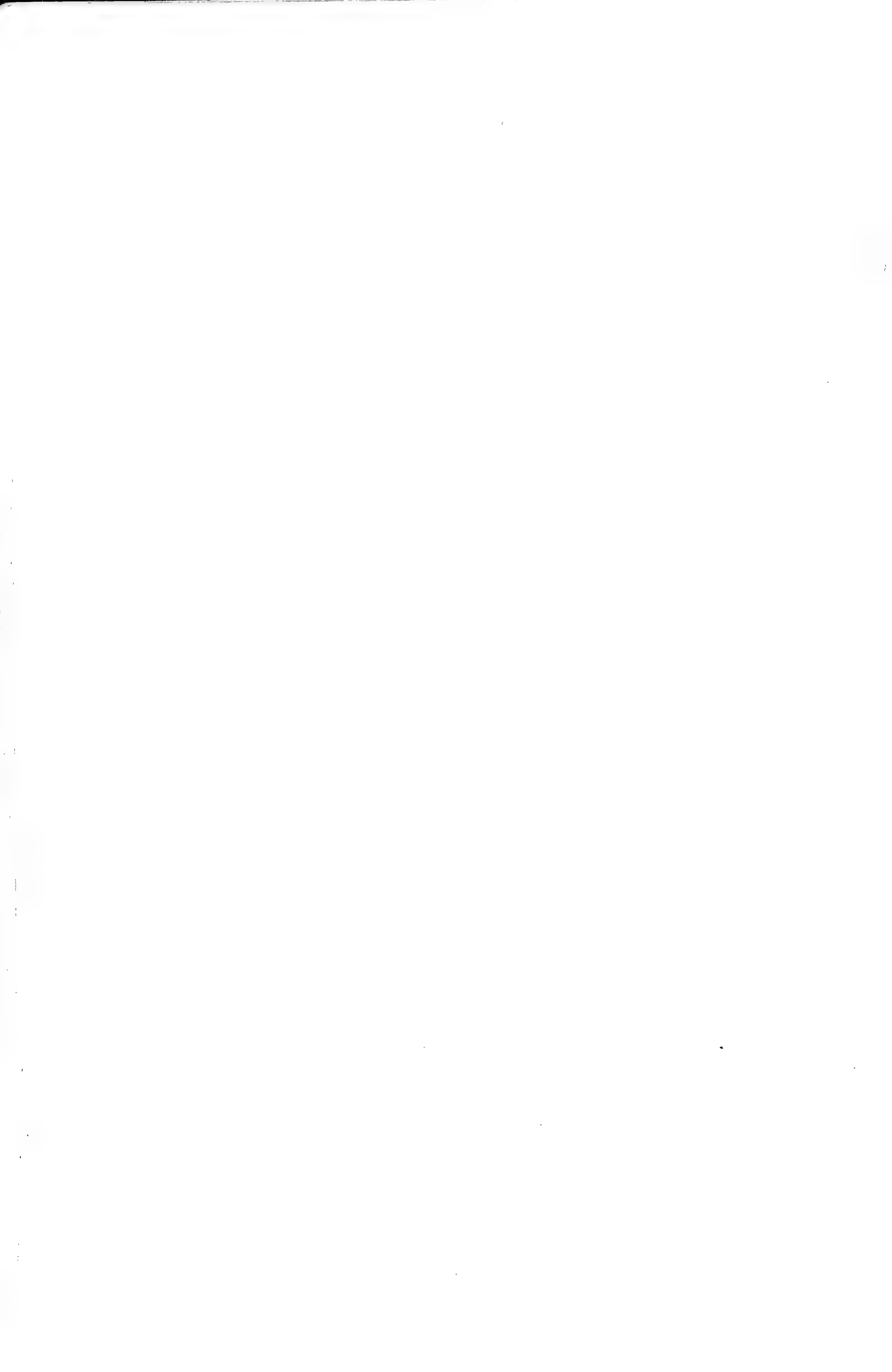
September 26, 1951. Aricoma, 15000; Dpto. Puno, Peru
 between the big ♂♂. Occasionally one kicked back at pursuer.
 Occasionally 1 of 15 kicked back at another which crowded to close,
 or spat at another which came too close in front of it. 7:16,
 the ♂♂ ^{down slope then} ran back up canyon to its group. A ♂
 remained 50 yds. from the 15. The net movement of 15 had
 been 100 yds. across slope (to NE) & 50 yds. up slope.
 The 15 now among tula, rocks, & sparse bunches grass. The
 3 A ♀♀ had moved 50 yds. SSE, down main bottom of long
 mdr., since ♂ left. 4:25, the A ♂ walked 100' along slope (to NE),
 rolled on bare ground, then ran 100 yds., passing 50 yds. down
 hill from the 15 & not looking at them, to where ♂ had left the
 3 ♀♀. ♂ defecated, then down slope at run until came in view
 of its ♀♀ 50' ahead. ♂ stopped & looked up slope toward the
 15 150 yds. up the slope. The 15 straggled across rock
 slides going NE across sidehill. They go across, then down
 (mass of shale rocks sliding), then on toward crest S. Ridge at
 middle Indian Marker. A ♂ goes 100 yds. toward them & stops. 4:40,
 group of 15 ^{is} 50 yds. sht. of M.I.M. & A ♂ starts slowly back
 toward its ♀♀. Ad. ♀ urinates. Stream in spouts - 1/5 to 1 sec. -
 large, yellowish stream. 4:45, the 15 walk down crest of S. Ridge.
 The A ♂ defecates on side, still 70 yds. from ♀♀. The 15 go
 over crest of S. Ridge (4:47). All overcast, stratus; fair wind up
 canyon. No change by 5 p.m. Group A has 2 ad., 2
 imm. now.

September 27, 1951. At 6:30 a.m., A, 4, about 150
 yds. down canyon from where at 5 p.m. yesterday.
 Group B, 4 (3A + 1 imm.) was on lower slope of

Vicugna

September 27, 1951 Arioma, 15000', Depto. Puno, Perú
 S. Ridge, 300 yds. NE of Rock Shelter. ♂ descended to foot
 slope. a ♀ lay prone. 11 Livestock in House area 8:30.
 Examined leg of ♂ 1272. Foot 400 mm. long. On
 lateral side starting 95 mm. from heel was a gland
 35 mm. long + 10 mm. wide. This gland covered with broken
 layers of thin flakes, + below flakes skin yellowish
 white + fatty. Rancid fat odor, not strong. On under-
 side this skin yellowed in 50 x 15 mm. area, rounded
 at ends. Function?


September 28, 1951. at ^{6:30 a.m.} 2 a.m., group A 100 yds. W. of House in
 draw. Some by 8 a.m. 11:20 p.m., group B, 4, halfway down
 slope below foot of Long Mdw. Group A, 4, in Long Mdw.
 200 yds. W. of Rock Shelter. I circled below B to get to
 Basin. Disturbed 2 on S. Ridge 1/4 mile NE of B. Then 2
 went up (SW) on N. side of S. Ridge. I went to Two Huts.
 Group D not evident but a group of 12, probably ♂♂,
 grazed on slope 400 yds. S.W. of Island Lake, near or in D
 territory. By 2:20 I saw other groups: 5 below foot of
 green slope down from SW Mdw., 2 100 yds. N. $\frac{E}{2}$ of them, 1 300
 yds. S. of them, 9 (possibly 1 or + young) in draw just E. of Sum-
 mit (the old ♂ A 2 Y?), 2^4 about 300 yds. down canyon from
 them - in all, at least $12 + 9 + 5 + 2 + 1 + 2^4 = 33$ in area of
 less than 1/2 square mile ($3/4 \times 1/2$ max.). 3:35, I returned
 over S. Ridge + saw A + B about as at 1:20. Lone Joe,
 on slope just NE of S. Ponds Flat, whistled at me at
 600 yds. + fled at 400 yds., paying no attention to
 bull 100 yds. on other side of it.



Vicugna

September 29, 1951.

Aricoma, 15000', Depto. Puno, Peru

10:30 a.m., No cumulus, fair wind up canyon. I was on road in jeep near Summit. 150 yds. SW of Gray Rocks was band of 9 seen yesterday. 3 young of year of about equal size, lighter more yellowish color than adults + heads much shorter & wool shaggier. One adult grazed with the 3 young + other 4 adults (no imm.) 50' away. All in bottom of canyon on gently sloping green mat where several small pools of clear water. Adults joined young. All walked 50' S. up slope. One adult (♂?) rolled + rose. The 3 young rolled. Usually 2 or 3 thrashes on one side, prone, then down on other side + 2 or 3 thrashes. shake head after rolling. One shook body after rising. At least 2 adults rolled + all but first (♂?) lay down by 10:53 (rest period). One adult had lain next to young with chest against it + from this position could make only a feeble attempt at thrashing. 10:55, a second adult up + grazing. Two young on sides. An adult rose, turned around, lay prone, right wrist first. All on bare ground of slope. Two of young had rolled same place as first ~~seen~~ adult. One adult thrashed, bumping + jostling adjacent young. The young rose. Adjacent young spit at its head; it spit back (the spitting usually only blowing but occasionally white vapor seen). Young one then prone on opposite side of adult. 6 lying in 5 yd. diameter. Adult drags muzzle sideways on ground, then other direction, then shakes head. One young lies half on side, neck up, legs  - then shifts to prone. 11:07, ^{it} lay on side, belly up uphill, neck curving dorsally + on ground. Fairly strong steady wind. 11:10, a young + adult rose. Adult walked 50' to 2 grazers + grazed on

Vicugna

September 29, 1951

Aricoma, 15000' Dpto. Puno, Peru

dry grass. 11:12, all huddled, adult up. This one rolled on both sides, then rose. All joined. A young defec, then adult same side, then another young, then last young. Couldn't see young.

11:14, adult defec. same side, then a ♀ adult. All then grazed on dry slope where < 50% ground cover. One adult still very dusty.

11:20, one lay prone below group. One, ♂, grazed 50' above group.

3 young + 4 ad. graze in line, young not seeming attached to any particular ♀ adult. 11:30 all gave a start & ran 2 or 3 steps. The prone one rose. Chirp-chirp-chirp-chirp by one. All looked down.

canyon, then walked 100' up slope. Another start. Walked then 100 yds. up crest of ridge. I saw 4 running on S. side of stream.

One of 9 paused to defecate, then ran to catch up. 11:37, all out of my sight behind a ridge. An Indian walked down road near me but evidently other disturbance. Adults had led group &

last in file adult. 11:40, 300 yds. uphill from starting point & still going up in file toward slides of rough boulders. 11:43, I saw an Indian woman coming up canyon, now about 100 yds. from where group started (800+ yds. at time of alarm?).

September 30, 1951. Drove to Cuzco. At 8:30 saw the group of 6A3K in draw below summit. These not present at 2 p.m. when returned. At 9 a.m. saw 8, apparently all adults, at outlet of Lake Aricoma, & another 2 (one possible young). 1½ miles beyond foot of lake a group of 8 adults. At noon, back at foot of lake, saw $2\frac{3}{2}$ groups of several on dry plains but not close to outlet (now dry). In North Canyon about 2 p.m. saw group

Vicugna

Peru

September 30, 1951

Aricoma, 15000' Dpto. Puno,

of 6A14 just above road, not alarmed by car passing 100 yds. away. This probably the Loop group, about 50 head livestock now in Loop.

October 1, 1951. I went into Basin to look for 6A34. In

Long Mtn ^{6:05 a.m.} saw 3, A, 300 yds. W. of Rock Shelter. Saw on backs indicated little movement during night. Only saw probably before midnight. 6:30, in center of Basin, could not locate the 6A34 (Summit draw group). However, above road, 200 yds. N. of Gray Rocks, was group 6A14, perhaps the Loop group. There 7 grazed among rocks + dry grass on slope. The young one large but distinguishable. It stayed with no particular adult - behaved as ^{an adult} one of group. This bunch came at 7 a.m., having worked 100 yds. across slope, then 50 yds. back + up. at 6:35 I saw another group (4A14) in Basin. One a small young, its back height of horizontal line of side of mother as it nursed 2+ minutes at right side facing 45° from mother. Mother finally walked ahead + young's head then pulled away. One of the 7, ♂ lay prone 100' from others at 7:20. By 7:30 the other by ♂. ♂ rose + walked + ran 500 yds. across slope (to E) where 2 others. ♂ stopped to defecate on side en route. It ran 5 yds. past first one, head low, stopped, kicked out with hind foot, then chased the one 30 yds. downhill. The other stranger joined first + both, second leading, ran down slope to SE, occasionally stopping, for about 1/2 mile (to S. side of Basin). at 7:35, an adult + the juv. of 7 were prone. 7:40, ♂ returning to its group. Tense while standing 10 yds.

Virgatus

October 1, 1951 Aricoma, 15000', Depto. Puno, Peru
 from the 2 strangers before they fled, ♂ had backed back +
 out with one hind foot then other 5 sec. later. // A group
 of 3A1Y ^(juv. trailed the 3) ran up Basin passing 100 yds. from me, another parallel-
 ing the 3 but taking different course. // 7:50, adult then young of
 7 rose. All walked uphill 50 yds. + all but one behind a rock
 ridge. The one (♂?) stood atop ridge. A llama train passed
 up the road passing ^{dawnhill} 150 yds. below from the 7. When train
 past, the 7 walked across slope (to E.) 100 yds. + grazed on dirt
 slide occasionally (8 a.m.). Scarcely any vegetation on this slide.
 8:05, one [♂] adult prone. Juv. + an ad. defecated 10' apart at same
 time, then another adult where juv. had defec. 8:08, three 3 on
 across slope. Another (of second 3) defec. same side. Then
 one, prone, rose. Another defec. same side. First 3 cut back
 (W.) + above second 3, which joined. All 7 move up + across
 bare gray dirt slope. 8:12, ♂ at the defec. side. Noosa. Biver
 wolf howl twice. Works forefoot on side rapidly, then defecates +
 walks uphill toward others (did not lead!). 8:15, the 6 at crest
 of ridge + 2 lie prone. 8:16, another prone. 8:17, 2 more. The ♂ on
 ridge 50 yds. downhill from the ♀♀. 8:20, all but separated ♂
 prone on ridge, then ♂ prone, 30 yds. from nearest ♀. 8:25, the
 large group with 3 juv. now in the draw leading to summit,
 grazing on N-facing slope 100 yds. from bottom of draw, only 8
 visible at present, all 9 at 8:40. 8:45, of the 7, 3 stood (incl.
 ♂), at least ² ~~one~~ prone again (~~2?~~) + 1 out of sight over ridge +
 8:50, all of the 7 over ridge out of sight - into N. Canyon
 above broken road. // At 8:50, the 4 moved 100' up the slope
 rather nervously + bunched close together, then grazed

Vicugna

October 1, 1951.

Aricama, 15000', Depto. Puno Peru

across + somewhat up the slope. Moved 100 yds. by 9:15. One lagged 50 yds. from others - below + behind. 9:23, main group reached rock ridge + reversed course. They looked toward road where an Indian sat with 12 llamas nearby, 400 yds. away. The Indian went on down canyon. Vicuñas not easily alarmed by people near road. One llama pursued another + tripped its hind legs with head. Followed the leader fell. Then follower lay prone on other neck with forelegs on neck (first stood ^{outside} away down one as if to mount). 9:40, ♂ of 9 (lowest separated one of groups) put head low + ran 100 yds. across slope (E.) to a rock prominence. 3A14 had come up canyon to 200 yds. downhill from the 9. When the ♂ saw the ♂, they suddenly started + ran a few steps, then stopped. After about 2 minutes the ♂ ran at them + they fled. ♂ then defecated on pile where the ♂ had been. 9:45, one of 9 groups prone, ♂ still 200 yds. away. ♂ went 50 yds. further down hill to green bottom, apparently drank, then (9:47) loped 50 yds. back toward group. The ♂ grazed 200 yds. from the 8 (still at 10 a.m.). 10:15, a second (more?) prone of the 8 (3 behind rocks). 10:22, ♂ walked 50 yds. up slope, defecated, then walked toward the 8. 10:25, ♂ ran to the group. Prone over rose. One juv. raised tail vertically. 10:27, one juv. nursing at right side of adult. Finished 10:29 1/4. Because some of group hidden, I may have missed ^{seeing} some nursing. 10:30, all 9 visible, at lower edge of rock ridge, 200 yds. S. of bottom of draw. 10:36, one ad. defecated. By 10:45 at least 5 ^{others} defecated in turn on same pile, then 2 young defecated in turn in pile 10' away, + adult on

Vicugna

October 1, 1951.

Ariconima, 15000', Dpto. Puno, Peru

pile other ~~ads~~ adults used. Probably 1 or more ~~seps~~ ^{seps} ~~teris~~ ^{teris} & or not at all. 10:55, one prone, all 50 yds. SE of 10:30 posit. By 11:03, about 4 others appeared to be prone (visibility of them poor). 11:05, all prone but the 3 ~~imm.~~ young. 11:10, only 2 young up (of 4). 11:15, only 1 young still up - this one down at 11:18, all 9 in 50' diameter on a flattish knoll. One rose at 11:30, another² at 11:40. By 11:44, 6 up + grazing, 8 up $\frac{1}{2}$ min. later. Last up 11:47. One rolled & remained prone. 11:52, another walked to bare spot, rolled, rose, shook. Prone one up after 3 \pm min. down. The second roller remained 100' from group, then (12:08) walked 50 yds. down slope (out of sight). A group of 3⁴ (1 juv.) ^(same as shown earlier) again 200 yds. down slope from the 9. The 8 (of 9) worked back to 10:30 posit and farther down & across slope, then (12:15) walked quickly in long ^{file} line to bottom of draw where they apparently drank. One min. stopped & rolled en route. The separated one descended slope, defecated 100 yds. from the 3A14, then walked toward drinkers. All grazed in gently sloping bottom of wide draw near green mats. 12:50, one grazes on S. side of stream, the other @ 100' away to N. of stream. Same 12:45, all but 1 out of sight so I went to top of Gray Rock, arriving 1:15. The single one spotted me though only part of my head visible 300 yds. away. The 8 joined the one & all 9 ran across & up slope 150 \pm yds. & stopped. Several rolled. At 1:20, 6 were lying on the bare slope, all but 1 lying there at 1:27. 1:45, a juv. + adult up. Juv. nuzzled at rt. side adult 2 minutes. Adult then lay prone. Juv. rolled in dust, then lay prone alongside mother. Another juv. rolled much on dust spot. Then it stood behind mother

Vicuña

October 1, 1951

Ariconq, 15000', Depto. Puno, Peru

of first + this adult turned head back + blew at juv. Juv. lay prone 3' away. Third juv. rolled, then stood + grazed, other 7 prone. 1:53, adult up, waved tail about, rubbed outside of one hind leg with metatarsus of other leg, grazed. Another rolled, rose, then prone again. 1:58, the separate one (♂?) prone 50' from nearest other. 2:00^{an} adult rose, then down on dust spot, thrashed, rose, grazed. Ground cover about 10% here including Oxynophyllum + bunch grass. 2:06, the presumed ♂ rose; 5 still prone. 2:07, 2 ♀♀ rose; one grazed, other panned dust spot, then ^{stayed down.} rolled. The "mother" up, washed 5 yds. to dusty spot, rolled. The two juv. near "mother" rolled, then one up + other remained down (3 down). 5 of these up graze together, the 6th, 50' away from them. 2:12, juv. up, washes 5 yds., grazes, then prone again. 3 prone in 5 yd. diameter. 2:15, these up - last rolls - and all down slope 50' to join others. Apparent ♂ defecates + second ♀♀ 50' away. ♂ suddenly runs to group + chase a ♀ 100 yds., then the 2 stop 100' apart. Another short chase. The group downhill straggles up toward ♂. Whistling cry given. All start across + up slope (to W.) 2:22 as if in alarm. They halted 200 yds. from starting point. Apparent ♂ heads group in file. 3 juv. followed by 1 adult at rear. 2:30, leading one + another ad. defecated + moved slowly on. Group on opposite side of rocky ridge from path of flight a few days ago when they were disturbed. 2:35, group of 8 together and 1 20 yds. behind, all about stationary. 2:50, all 9 started working across + down slope toward from whence they came. One ad. apparently spit several x at adjacent one, settling its head closer + closer. The other faced away, saw down. First put muzzle to side

Vicugna

October 1, 1951

Aricama, 15000', Dpto. Puno, Peru

of other (to bite?) + other spit into air. Other hunched hind foot back once + shook head 2 or 3x. Then turtle stopped. About 8/10 cumulus + wind still up canyon (3 p.m.). 3:20, group had worked 100' downhill. One 20 yds. uphill from rest. 2 lay on sides on grassy spot + thrashed. All 9 grazing vigorously 3:30.

October 2, 1951. At 6:30 a.m. from Rock Shelter I saw 4, 3, 400 yds. W., up long incline, on edge green mat. B, 3^{at}, near top of S. Ridge above N end of S. Ponds Flat. Clear, breeze down canyon. At 6:45 I saw the Summit group about 50 yds. below road + 300 yds SW of Gray Rock - opposite side of draw from 3:30 yesterday. Possibly spent night above road. The group descended to canyon bottom + at 6:55 were up the opposite side at spot where rested at 10:30 yesterday. One (or?) prone on knoll, 8 grazing nearby. Other groups seen: just N. of Island Lake, 3 AIV; 300 yds. SW of Island Lake along foot S. Hill, 4 (no young); another 400 yds. toward SW from last, 6 adults; to N. of there, 200 yds. beyond stream, 3 AIV (group seen yesterday in this area); a lone one near there. Altogether $9 + 4 + 4 + 6 + 1 + 4 = 28$ in area 1 mile \times $\frac{1}{4}$ mile. 7:29, second ad. of 9 prone, 100' from first. Both up + looking around at 7:25. Apparent ~~or~~ prone again in 3 min. A second ad. prone 7:30 but up 7:40. 8 up 7:41. All 9 grazed on brown grass slope among rocks. 7:50, one ad. prone (not or). Another 7:55 + a 3rd. 7:57. Then 1 juv. lay on side in grass. 8:03, another ^{juv.} ad. down. ~~prone~~. Two ads. longest down nose + looked as Indian walked along road 700 yds. away throwing stones. 8:05, third juv. down, the 3 in 10' diameter, 2 down on sides. 8:07,

Vicugna

October 2, 1951

Arizona, 13000', Dots Run, Rev

prone juv. up + grazing. 8:12, an adult up leaving only 2 juv. down.
 8:14, apparent ~~ad.~~ ^{another ad.} down. 8:16, up again. 8:18, ad. p defecated.
 One juv. rose, then other, so all up + grazing 8:19, all in 20 yd. diameter.
 8:23, one ad. lay on side on dry grass. 8:30, ~~ad.~~ ran about 50' as
 if to look at source of alarm + other ~~ad.~~ followed in bunch (prone
 one up + joined). After standing 1 min, all grazed. 8:36, 1 prone but up
 in 2 min. 8:41, 2 prone. 8:46, prone up + all moved 50' across
 slope (to N.). 8:58, one again prone, others in line grazing. 9:07, a
 juv. defecated, working forefoot on side first, then 2 ad. defec. on
 same pile. 9:15, a second ad. prone; then first rose + grazed. 9:17,
 a juv. moved at left side adult for 2 min. or +, then adult turned
 toward juv. ~~and~~ it walked away so juv. head withdrawn; juv. did
 not follow adult. Others of group seemed to pay no attn. 9:30,
 another prone (juv. ?), + another juv. beside it. 9:39, prone adult up,
 still 2 juv. down. 9:46, the 2 juv. up + washed quickly 20 yds.
 to group which was very slowly working down slope. An ad. defec-
 ated. All went across slope 100' ^{quickly} ~~back~~. One ascended a low
 rock ridge (S). after 3 min. (9:55), all but the ~~ad.~~ descended
 slope at fast walk for 150 yds. to green floor of the draw. The ~~ad.~~
 remained on rock 2 min., then ran down canyon, at rt. angles
 to direction of ~~ad.~~, toward a group of 3418 500 yds. distant. After
 150 yds. it suddenly stopped, at fence pile, then defecated. It went
 100' to rock ridge, stood looking for 2 min., then out of my
 sight behind a ridge. All but 1 of the ~~ad.~~ hidden from me behind
 rocks in bottom of draw (descended to drink a for green feed?).
~~ad.~~ of 9 did not reach lower group + perhaps was chasing
 some hidden from me. The 4 were about 200 yds. from me.

Vicugna

October 2, 1951.

Anconia, 15000; Depto. Puno, Peru

after 5th min. they noticed me + one gave descending screaming call. all 4 moved 50 yds. away. I sitting in open among rocks + moving some. Possibly ♂ returned to ♀, now all hidden (10:10). The local 4 grazed 250 yds. away. 2 or 3 (not juv.) had defecated about 10 a.m. 10:20, one of 4 rolled on dust area, then up + grazed. 10:21, another adult [♂] prone on this dust area. 10:27, prone one [♂] up + grazed. 10:28, an adult [♂] to dust spot, dropped to urinate, then to knees + over onto side, thrashed 3x, stayed prone 1/2 min., then up. The 4 walked 50 yds. away from me + grazed alongside dry bed of a creek. The 4 looked toward 2 Indians + several ^{10± llamas,} llamas one man playing a flute, ^{400 yds uphill, near road,} but seemed little alarmed + continued grazing. 10:35, the ♀ visible on N. side bottom of draw, one 30 yds. from rest, some defecating. The ♀ allowed the men + animals to pass on the road, 250 yds. from them, without leaving bottom of draw or seeming much disturbed. At 11 a.m., 1 or + of the ♀ lay prone. The young of the 4 once went alongside adult from rear + was blown at; again, adult walked quickly away (trying to nurse?). 5/10 cumulus + fair breeze 11 a.m. I departed. No stocks near House today. At 3 p.m. group B, 4, 300 yds. NNE of House on S. Pando Flat. Group A, 3, 400 yds. up Long mdr. from Rock shelter. At 2:30 p.m. I visited Ice Lake. Two in Ice Lake mdr., the familiar group of 6 (1 juv.) at S. side of lake.

October 3, 1951. At 7 a.m., group A, ^{3,} on green mat 400 yds. up Long mdr. from Rock shelter, + group B, 4, at foot of Long mdr. as if had ascended from lower on S. Ridge. At noon the Summit ♀ not apparent from road near Summit.

Vicugna

October 3, 1951

To Palmera, nr. Asillo, Dpto. Puno

about 12:30 at foot Lake Arconia, groups of 10, 5, & 4, no young apparent. About $1\frac{1}{2}$ miles beyond outlet of lake (now dry) a group of 4 adults. // At Palmera Sr. Orellana told me that a female killed near there a week ago had an embryo smaller than size of fist. The Indians there said young born Jan. - March. Roberto Dammert traveled roads much & said many vicuñas, more than here, on road up from Nazca (^{Enr. Chalvanca & Castro Virreyena} & other places; question further with maps). A vicuña skin, fresh, hanging in yard so at least 2 killed in last week. // Have ~~never~~ young vicuñas with people at Rosaro.

October 5, 1951

Rosario, Dpto. Puno, Peru

about 2:30 p. m. saw group of 7, including 1 young, at green spot on hill $\frac{1}{4}$ mile behind Rosario. An Indian near Cuzco tried to sell me the hide of a vicuña.

October 6, 1951. Solo

Arconia, Dpto. Puno, Peru - 15000'

about 6:30 a. m.; a group of at least 3 on slope 100 yds. W. of House - slept there?

October 7, 1951. ~~Strohm~~ overcast; occasional snowflakes. at

8 a. m. I was on road below Switchback & saw group of 6 AIV on bank just below road (in N. Canyon). These retired to 50 yds. below road as I drove by. I stopped to watch from road 200 yds. distant. One ad. defecated 8 a. m., another 8:10. By 8:10 3 were 100 yds. below road on flat green-mat bottom of N. Canyon. This is the Loop Group evidently. 8:15, 5 on mat & 1 100' up. road bank. They seem to feed from the mounds of Distichlis. One on slope chewed 10" long dry grass. The young

Vicuña

October 7, 1951.

Aricoma, 15000', Depto. Puno

one does not have pale spot in or on rostrum but is lighter in color than others. By 8:30, all 7 in canyon bottom 200 yds. from me. 8:55, a truck came up road & blew horn; vicuñas, 200 yds. downhill, looked up occasionally but seemed little alarmed. 8:58, one gave a hoarse cry; all ran 50 yds. down canyon - only apparent source alarm was the truck, $\frac{1}{2}$ mile away, which had turned on rivetablock so that white canvas on side glared in sun. Vicuñas grazed again in 30 sec. 9:05, the juv. drank in pool 3' diam., only tip of muzzle touching water. 9:12, one defec. on pile; another adult $\frac{1}{2}$ min. later, same pile - another 9:15. 9:25, juv. defec. same pile. Overcast & windy. 9:30, one ad. prone. 9:40, ♂ defec. ^{+ urinated} on different pile. Brushed head in tuft grass or paused in walking. All but 2 on ^{steep} moderate slopes, $\frac{1}{2}$ vegetated, above green mat toward road (9:40). 9:43, ad. defecated, then he prone one which rose & joined others. 9:54, 2 lay prone on bare ground of slope, across slope. 10:05, one of prone up & joined the others, still at foot of slope. 10:10, the prone one, apparently the ♂, stood, scratched head over eye with tip ~~head~~ hind foot, nibbled at foot on ground, grazed 20 yds. up slope from others. 10:13, a ♂ prone, then another & the juv. after hind knees on ground, wrists shifted forward one at a time as chest down. 10:16, one ad. ♀ rose, then one (same?) down prone 1 min. later. One prone has heels together and 4" above ground. 10:25, a fourth prone. One prone lay on side (weak sun out). ♂ still 20 yds. up slope from others. ^{Two} One ♀ darker & larger (older) appearing than others. 10:37, longest prone up. 10:40, ♂ down slope to group at foot so all within

Vicugna

October 7, 1951. Aricoma, 15000', Dato Puno
 50' diameter. 10:48, a fourth prone. Light hail falling; windy
 & overcast. 10:57, one ♀ up. 11:05, a fourth prone (when no
 seen little animal lying on side?). 11:10, juv rose, moved 10';
 again prone. All 4 prone face down wind. Rain & hail. 11:17,
 juv. up; another prone. Juv. ^{appeared} ~~reared~~ to nurse, for several se-
 conds only. Wet rain, fairly hard & wind driven, seems not to
 cause reaction. 11:20, 5 prone, 1 facing opposite to others. 11:22,
 sixth prone - but 1 rose. Rain makes visibility poor. One of the
 2 up, the juv., defec., then lay prone. 11:27, two adults now up.
 By 11:30, 4 adults up & grazing in the rain. 11:35, last 2 up.
 One defecated, then the other. All grazed on greenest mat near
 water in 10 yd. diameter in rain & wet snow. 11:50, one def-
 ecated. ♂ then moved pile & gave wolf hand, then walked 5 yds.
 & lay prone. Still raining. Another defec. on another pile, &
 another on this pile. All prone on or upon bottom in, wet snow
 falling steadily, at 12:00.

October ¹⁰ 8, 1951.

Going toward Inata from Ocururo, saw first vic-
 unas at 14700' where grass short & near upper limit
 of grass. By time we were at 15250', 18 miles from Ocu-
 ruro, saw groups 5, 6, 7, & 5, ^{4 5} all on ground more Pycno-
phyllum than grass. Ground of greenish aspect. Herds of
 alpacas common. Groups of 6 about 1/2 mile further on.
 No more seen until 25 mi. from Ocururo when 6, includ-
 ing 1 young, seen 100 yds. from road. Occasional huts &
 alpaca flocks. Grass 4" or less high - a 7 miles further,
 groups of 9, 16, & 6 on flat & gentle slopes. Some within

Vicugna

October 10, 1951

Ocoruro - Imata, Dpto. Puno, Perú

100 yds. of alpacas. In next mile groups 5, 3, 7, 6, + 4 within $\frac{1}{4}$ mile to W. of road. .8 mi. further, 5 A1K near road. All were about 15200' on fairly flat plain between hills 1 mile apart. 2 more $\frac{1}{4}$ mile from the 6. Within $\frac{1}{2}$ mile up road of 6, groups 5 + 12 (on dark green Distichlis mat). 5 about $\frac{1}{2}$ mile on. 12.9 miles from Ocoruro, 8 (1 young, trying to nurse). No alarm until after car stopped 50 yds. from closest for a few minutes. 1 mile on passed group of 11 on slope among tala, within 100' of alpacas. 32 miles from Ocoruro, 7 A3K in band 50 yds. from road. 2-3 miles on saw 2, 1, 4, 3, 4, mostly in dry very shallow marshy lake bed, no vegetation visible at 100 yds. with leaves where some fed. In next mile 2, 2, + 2 (1K) or +? Broad rolling faintly greenish short grass & Rynchosyllum.

38 mi. from Oc., 6 near road. 40 miles, down to 14700' out of long ~~narrow~~ ^{narrow} plain into rolling area with little rock. 43 miles from O., 2 + 9 (1K) on plain. A mile on, 7 A1K, 3A, + 6 A1K. 47 mi., 4 + 2 + 3. 3-48 mi., 3. 50 mi., 2. 53 mi., 2. 54 mi., 3, 10, 6, 1, mostly near running ^{river} ~~on~~. A mile farther 6 A1K. 59 mi., 25 \pm , + 6, 10, 20 \pm , 2 on an extensive nearly flat greenish ~~plate~~ plain. 200 \pm alpacas on another part of plain. 60 miles, 2 + 5, this 7 miles from Imata. 5 miles beyond Imata toward Pati, a group of 7 (incl. 1 young) on sandy flat area near stream.

October 11, 1951.

5 mi. S. Imata, Dpto. Puno

at 7:30 a.m. the group of 7 on sandy hill (scattered tala)



Vicugna

October 11, 1951.

Opto. Arequipa, & Tinicopalca,
Nr. Imata, Opto. Puno, Peru200 yds. from where seen last evening. Departed camp
toward Pati.

11 a.m., 7 mi. past Imata, 9 (1Y, or 2?), on flat green
area. Vegetation stopped 13 miles beyond Imata. 17 mi.
past Imata group of 8, 1 (or 2?) young included, on flat
loose bare ground where principal vegetation small
clumps Pycnophyllum covering about .1% of ground. One
nursed as I watched. Continuous green vegetation 250
yds. beyond the groups. On Arequipa road toward Puno,
(4 mi. from Imata-Puno Junction)
130 km. from Arequipa saw 2 running across bare soft
dirt flat for 1/4 mile +. Km. 133, where we had seen our
first vicuñas in Peru, saw 1. 8 mi. from junction saw
4, 5, 4 1/2 on green short grass rolling area. River here
dry. No livestock. Km. 138 (3a + 1)!
1/2 mile on, 13 + 5 + 10 (2 young),
all within 200 yds. of road. Occasional small pool water
in stream bed. 10 mi. from junction, 2 + 5 + 5 (1 or 2).
Km. 139 1/2, 10 (1Y). Km. 140, 30 ± (all or 0? - most youngish
but 3 or 4 also appearing or 0?), 6 (2Y), + 4. By Km. 142,
5, 7, 7, 4, 3, 3. Summit, 15350'; at Km. 142 1/2. Km. 143,
2 + 6 + 1 + 2. Then 14 (3Y, one larger than other 2) - this is
largest family group yet seen! Vicuñas near road
have toward cars & allow stopping 100 yds. away
without showing much alarm. Km. 145, 4 on hillside.
17 1/2 from junction, 9, 1, 1 young, one suckling standing par-
allel to ♀ + behind, head turned sideways, back, & eye,
shoulders behind hind legs ♀. + here near small slow
stream in canyon bottom. 1 mile on, 14550'; group of
5 adults on flat near stream. Tinicopalca at km. 123

Hay/oreo area



Vicugna

October 11, 1951

Nr. Tincopalca, Depto. Puno

from Puno. Km. 113, one in bottom of a lined canyon. Km. 110, 8 low in wide canyon with much brown ichu. Km. 106, 5 near road in grass. Branch to Juliaca - Puno at about km. 101. Last vicuñas at about 14500'. Lack of livestock between km. 132 - 143 (from Arequipa) notable. Heaviest concentration roadside groups seen anywhere, & high proportion of young.

October 14, 1951

Nr. Lake Aricoma, Depto. Puno

Driving up to lake from Crucero saw group 6 about 5 miles before foot of lake, & 7 at foot of lake.

October 15, 1951.

Aricoma, 15000'; Depto. Puno

At 9 a.m. saw group B, 7, about 200 yds. NW of Rock Shelter. Group A not seen. Walked to see Lake. The Ice Lake group, to 5 A.M., was 100 yds. S. of Lake. At 1/2 mile distance one gave a cry & all walked quickly away, then 300 yds. uphill in the shallow draw of usual retreat. None seen at upper or W. side mdr.

October ³⁰29, 1951

Driving from Lake Aricoma to Crucero, at dry lake outlet (within ^{600 yds.} 1/4 mile of) saw groups of 2, 2, 3, 11. No green here. Heavily grazed dry grass on flat area. Lower small lake dry. About 2 miles on saw 5 & 2 on dry short grass slopes.

October 31, 1951

Roberto Darnment of Palmera said he had obtained a vicuña fetus from animal which died Oct. 29, about 1 ft. long, without hair. He was drying it in sun to save for me. He said that near Castrovirreyna and Chalhuanca, on roads from Pisco & Nazca to Cuzco,

Vicuñas

October 31, 1951.

Nr. Asillo, Dpto. Puno, Peru -

there were more vicuñas than anywhere in Dpto. Puno.

November 7, 1951

Huaylarco, 52 mi. ENE Arequipa, 15000'

On road Puno to Arequipa, saw 6 vicuñas on Puno side at km. 136 from Puno. Then at about km. 143 1/2 from Arequipa saw bunches, + from there on to km. 133 (went no further). Many young; groups up to 30; not disturbed by car passing 50-100 yds. away.

November 8, 1951. 12:30 p.m., at km. 132 from Arequipa to count vicuñas along road. E. wind; 9/10 overcast.

Km. 132 (M 79.3) - no veg.; flat -

132 1/2 - - - 4,500 yds. S.; 7,100 yds. S.
 132 2/6 - flat, sparse sh. gr. - 12,200 yds. S., no v.; all or? ?
 132 5/6 - " " " - 5,500 yds. S.

133 (M 80.0) - lake 1 mile S., flat, sparse sh. grass.

133 3/4 - flat, sparse sh. veg. - 13 (45, 107) - 1/4 mile from lake.

Hills begin close to road on S.

133 1/2 - flat, low hills, coarse clumps grass - 300 yds. N. 10 (25, 107),

135 2/6 - teleg. line crosses N. to S. side rd.; hills to N. N.

100 yds. from road.

135 4/6 - camp, 100 yds. N. S.

135 5/6 - teleg. line crosses S. to N.

136 2/6 - " " " N. to N.

136 3/6 - ft. of greenish slope across ^{rain-dashed} - 16, all or? ?
 300 yds. S. of road.

136 4/6 - culvert

137 - ft. green slope - 4 (15, 107), 200 yds. S.

137 1/6 - flat, 8/10 sh. grass - 150 yds. S. 5 (2 lg. young.)

Vicugna

November 8, 1951

Huaylarco, 52 mi. ENE Arequipa137 ²/₆ - gentle green slope - 16 (5Y, 10Y), 200 yds. S.137 ⁴/₆

+38 - culvert

138 ¹/₆ - rolling, pale green, sht. grass - 13 (5Y, 10Y), 150 yds. S.

2 ¹/₆ - flat, " " " " - ~~12 (2Y, 10Y)~~ 8 (3Y, 10Y) } 250 yds. S.
~~8 (3Y, 10Y)~~ 5 (0Y, 10Y) }

3 ¹/₆ - rolling, pale green - { 38 (all 0Y, 10Y) - 100 yds. S.
 { 6 (1 pale small Y, 10Y) - 200 yds. S.

(The 38 chased by 2 or 3 0Y, 10Y from other bands).

4 ¹/₆ Several of the 38 0Y, 10Y (all or all but 2 or 3 appeared youngish) bathed in pools wrist deep. Dipped arch of neck, then forelegs down, then (some) hind legs bent (sometimes up & down part way 3 or 4X and never all the way down). Some sat in water, shake body after raising from water. water up to anus level. 0Y from up canyon came & herded group about but some bathed with 0Y only 10' away. Occas. 1 hissed at 0Y. another 0Y came up canyon & herded parts of group. The family 0Y, 10Y with tails up; young 0Y, 10Y tails down. Some fed on grass while standing in water.

5 ¹/₆ 3' wide culvert - 3 (0Y, 10Y) 100 yds. S.
 - teleq. line crosses; culvert.

139 - rolling green - 11 (5Y, 10Y) 100 yds. S. - 4 of the 1 met so if had bathed recently. Two squealed in different pitches when I walked to 50 yds. from them. All ran 250 yds. & up a slope; then soil defecated.

139 ¹/₆ - broken bridge on S. side

2 ¹/₆ - stream crosses road, N. to S. side. Slope of hills at roadside on S. side.

~~11.1~~

6.7

Vicugna

November 8, 1951

Huaylarco, 52 mi. ENE Arequipa, 15000'

139 5/6 - culvert

140 - rolling, green, some rocks - 4 (1Y, 107), 50 yds. N.

1/6 - 5 (1Y, 107), 100 yds. N

2 (0Y), 100 yds. S

5/6 - rolling, sht. grass, rocky - 9 (0Y) - 200 yds. S. - 0707?
 140 5/6 - tel. bird, crater - sent to nurse.
 141 1/6 - tel. line crosser
 141 1/6 - barren, rocky, rolling - 5 (1Y, 107) - 100 yds. S
 - 14 (3Y, 107) - 200 yds. N

3/6 - flat, rolling, 5/10 sht grass same - 5 (0Y), 300 yds. S. (9 about
 100 yds. beyond)

5/6 - " " " - 6 (1Y, 107), at rd.

- 1 ad. - 100 yds. N.

142 (186.0) -

- 3 (1Y, 107) on rd.

6 (2Y, 107), 200 yds. S.

142 2/6 - summit rock pile. Flat rolling rocky

- 4 (0Y), 200 yds. S.

143 1/6 - rolling, green, sht. gr. - 36 (0Y; prob. all 0707), 200 yds. N.

2/6 - 5 (0Y) ad. - 150 yds. S.

1/6 - 6 (1Y, 107) - 200 yds. S.

4/6 - started down; rolling, sht. grass, greener. 2 burros ^{on green flat.}

Gen'l: Bathing seen. Young still nursing. 0707
 from bands still chasing large bands young 0707.
 Largest family group 16 including 5 young.

Totals: km. 132 3/6 - 143 3/6. Bands 9 or + without
 young counted as all 0707. Smaller bands all
 adults counted as 107, others ♀♀. Bands with
 young assumed to have 107. Fades to ~~total~~, Max.
 15 chain (330 yds.) from road, both sides, though

| C. Koford | | November 8, 1951 | | Vicuña | 2358 | |
|-------------------|------|------------------|----|--------|-------------------|--|
| KM. | 0707 | ♀♀ | ♀♀ | YY | Huaylarco, 15000' | |
| 132 $\frac{2}{6}$ | 12 | | | | | |
| $\frac{4}{6}$ | 1 | | 8 | 4 | | |
| 134 $\frac{1}{6}$ | 1 | | 7 | 2 | | |
| 136 $\frac{3}{6}$ | 16 | | | | ROADSIDE | |
| 137 | 1 | | 2 | 1 | CENSUS | |
| $\frac{1}{6}$ | 1 | | 2 | 2 | DATA | |
| $\frac{2}{6}$ | 1 | | 10 | 5 | | |
| 138 $\frac{1}{6}$ | 1 | | 7 | 5 | | |
| $\frac{2}{6}$ | 1 | | 4 | 3 | | |
| | 1 | | 4 | 0 | | |
| $\frac{3}{6}$ | 38 | | | | | |
| | 1 | | 4 | 1 | | |
| $\frac{5}{6}$ | 1 | | 2 | | | |
| 139 | 1 | | 5 | 5 | | |
| 140 | 1 | | 2 | 1 | | |
| $\frac{1}{6}$ | 1 | | 3 | 1 | | |
| | 1 | | 1 | | | |
| $\frac{5}{6}$ | 9 | | | | | |
| 141 $\frac{1}{6}$ | 1 | | 2 | 1 | | |
| | 1 | | 10 | 3 | | |
| $\frac{3}{6}$ | 1 | | 4 | | | |
| $\frac{5}{6}$ | 1 | | 4 | 1 | | |
| | 1 | | | | | |
| 142 | 1 | | 1 | 1 | | |
| | 1 | | 3 | 2 | | |
| $\frac{2}{6}$ | 1 | | 3 | | | |
| 143 $\frac{1}{6}$ | 36 | | | | | |
| | 1 | | 4 | 1 | | |
| $\frac{2}{6}$ | 1 | | 4 | | | |
| 135 | | 96 | 39 | = 270 | | |

Vicugna

November 8, 1951.

Huaylarco, 15000', Dpto. Arequipa

only 100 yds. sometimes visible on one side road.

♂♂ 135 ♀♀ 96 Y 39 = 270 vicuñas. Maximum

area included = $\frac{30 \text{ ch.} \times (7.25 \text{ mi.} \times 80)}{10} = 1740 \text{ A.}$

Density well over $\frac{1740}{270} = 6.4 \text{ A./vicuña}$. This density probably high because near water in stream bed. Of the 135 ♂♂, 23 with ♀♀. The 23 groups averaged 4.2 ♀♀ and 1.7 young per group (max. ♀♀ 10, in groups of 14 & 16; max. young 5, in groups 11, 13, & 16). 112 ♂♂ of 135 not with ♀♀. Ratio ♀♀/young = 2.5. Of 270, 14% were young of year.

November 9, 1951 overcast, strong E. wind, occasional light rain & wet snow. I went by car to Km. 138. Near water in creek, 100 yds. S. road, group of 12 (5 young), at 11:10. as car stopped they walked up slope & slowly away, about 300 yds., then grazed on short grassy rocky gentle slope. By 11:20, 4 ad. ♀♀ defec. & urinated on one pile. Urine in spurts of 2 sec. or less. Then young (sex?), & 2 ad. ♀♀ def. & ur. on pile 50' from first. Additional squat for urination, posterior angle at heel about 110° during this squat. Urination followed immediately after defec. Dorsal half of ~~an~~ anass protrudes during defecation ~~at~~ P. 11:30, the group spread 150 yds. Ground 1/2 bare with scattered rocks, Pyrenophyllum, & tufts coarse grass up to 4" high. Perhaps same group as counted as 13 yesterday at 138%.



[at this date read assumed E & W]

11:37, at start of hail & rain flurry, 5 ran back toward center of group. Within 2 minutes the 5 young &

Vicugna

November 9, 1951

Huaylarco, 15000', Dpto. Arequipa

2 adults were lying prone facing down wind, necks arched  and ^{tops} heads barely above back level. Two others 50 yds. distant in same position facing down wind. Prone ones chew cud. Cars horizontal + back. Other 3 grazed up to 50' from prone ones. Heads even lower when gusts harder; crown 2" below level back + ~~per~~ basal $\frac{1}{2}$ neck seems to be on ground. 11:45, 2 more down in same position + orientation; last one up grazed (♀?). 11:47, last down. 10 within 20 yd. diameter, 2 50 yds. away, all on open ground on moderate slope on windward side of hill. This is first time I have seen ^{large} a group oriented in same direction. All the young are nearest 2 ♀♀, not each with own mother.  Three white areas: base throat neck, posterior humeral area, anterior femoral area. One juv. with neck + chin on ground. 12 M - wind remains; ^{rain} ~~some~~ stops. 12:05, one of last 3 down rose + immediately started to graze. Two more up within 1 minute; then 3 more in $\frac{1}{2}$ min. Only 2 still prone 12:07. Weak sunshine thru clouds. 12:07 $\frac{1}{2}$, last young up - one ad. still prone. 12:11, last up. Group spread 100 yds. None have defecated since rising. 12:16, juv. defec. briefly on pile. Then ad. ♀ def. + urin. on pile 100' distant; first moved pile 20 sec. + shook head, took a few steps tail up, then defec., squatted more + urin. Then another ad. defec. but did not urinate on same pile. 9 form a ragged line grazing, facing into wind. 12:24, one moved pile, walked forefoot on it (6x), defecated ably, walked off (07?). Three juv. lead in direction of movement while grazing. Another defec. briefly on pile. Occasionally one swished its head back + forth on the grass clumps as

Vicugna

November 9, 1951

Huaylarco, 15000', Dpto. Arequipa, Peru

if to scratch. 12:37, all 200 yds. from where had been prone - farther from road. Two juv. def. on pile. One squatted deeply - perhaps all juv. do this + not only ♀♀. ^[not] Group moved eastward at walk, then all ran several yards toward stream (200 yds. N. of them), then walked further toward point where I had seen them at 11:19, but ♂ over far side of low hill (out of sight). I drove 200 yds. up road to 200 yds. N. of group; they walked back to W., + juv. bringing up the rear. || About 200 yds. from this group, 200 yds. W. of road, was group of ♂ (3 young), + 5 (0 young) 150 yds. S. of them. These groups at same place yesterday afternoon. No reaction to my parking at side of road (12:55). Ground cover 9/10, mainly bunch grass 10" high + 1' diam. clumps, near dry stream bed where the ♂ fed. 300 yds. E. of the ♂ was group of 6, also near side of yesterday (1 young); there grazed on + near Distichlis mat. Ground has green aspect from basal leaves of grazed grass clumps + from mat-forming plants. 1:05, of the ♂, a young near 3 ads. ~~seemingly~~ ^{ads.} 2, separate. Evidently only 1 ♀ without a young in this group. 1:09, an ad. of ♂ loped 100 yds. toward 6, defec. on pile, walked back to ^{own} group, grazed 50 yds. from them for 2 min., then back to group. The ♂ + 5 about 100 yds. apart (1:15). One of ♂ lay on side on grassy bank, thrashed 2x (tail up), prone, then again thrashed, then stood. The ♂ graze as 2 groups + about 20 yds. apart. 1:22, one of the ♂ loped 50 yds, ~~back~~ ^{back} just above back level, toward the 5. One of 5 raised tail + stood erect; others ran off a few yds. Chaser stopped 5 yds. from other ♂

Vicugna

November 9, 1951

Huaylarco, 15000', Dpto. Puno, Peru

and stood facing away. No further approach. at least 4 of the 7 rolled on grass within $\frac{1}{2}$ minute. Two walked 50 yds. from others + one ^{of these?} (juv.) nuzzled for 1 min. at ^{right} ~~left~~ side of adult. Then there 2 rejoined band. 1:20, the 8 in compact group 20 yds. from 5. ♂ of 8 has scar on left side neck slightly over halfway up; ♂ of 5 has lesser scar a little lower + more anterior. Both groups have moved 100 yds. E., parallel, since ~~attempt~~ ^{altercat-} ion started. The 6 returned 3. up a draw $\frac{1}{2}$ hr. ago. 1:36, one of 8 rolled on side 3x on grass, rose, shook body. 1:40, ♂ of 8 gave sudden chase to a ♀ of 5, then ♂ of 5 came between + chased first ♂ back to its group. Glass-grating high cries heard. Groups, each compact, grazed 10 yds. apart. 1:48, ♂ of 8 gave vigorous chase to a ♀ of 5, around 3 circles 25 yds. in diam., then straight for 300 yds. before stopping. Chased one immediately stopped + started back. ♂ of 5 had followed chase but did not chase other ♂. Returning & accompanied by ♂ of 5; stopped at pile to def. 4 min. on way. ^{Then ♂ same, same side.} at start of chase ♀♀ each band had run in opposite directions. after ♂ of 8 rejoined, his group walked 100 yds. E. to base of bare area of hill. Two groups 200 yds. apart (1:53). The separated ♂ + ♀ of 5 grazed 50 yds. from the other 3 ♀♀. ♂ of the 8 led the others by 50 yds., then all ran to catch up on grassy flat, 250 yds. from former grazing site. 1:57, ♂ of 5 ran 100 yds. W. toward the 5. Another ♂, ^(one of the 5) not of the 5, ran toward it + chased (or followed closely) it back to its group, then ran beyond 50 yds. + stopped. Another ^{♂ (of the 6)} ~~was~~ near the 2 ♂♂. The lone ♂ then ran back toward the 5, ^{was} chased a few

Vicuña

November 9, 1951


Huaylarco, 15000', Dpto. ^{Arequipa} ~~Puno~~, Peru

yards by ♂ of 8, & ran 50 yds. past the 5 and on to W. ♂ of the 5 followed for 50 yds. & stopped. (The 8 grazed 100 yds. W. of where the 6 were earlier this afternoon). 2:07, the 4 ♀♀ joined their ♂, 50 yds. to W., so 8 & 5 over 300 yds. apart. 2:10, I drove 200 yds. up road to opposite the 8. The 6 were 150 yds. E. of them. After I stopped the 6 walked slowly 30 yds. further from road (to 150 yds. from road). Two of the 6 smallish or if yearlings: The 6 walked across a nearly plantless soil & rock sidehill, going farther E, away from me (in car). Still solid overcast & E. wind. The 6 descended the hill to creek (did not drink), crossed it, & then crossed road & ascended slope on N. side, crossing 300 yds. ahead of car (more at least 400 yds. after I stopped). The 8, 150 yds. from road, remained grazing. 2:22, within 2 minutes at least 4 of the 8 lay on side, gave a thrash or 2, rose. One juv. gave 1 thrash on one side, then over on wrist to ventrally to other side, gave a thrash, rose. 2:25, one from a group 500 yds. up canyon went bounding toward location of the 6. Most feeding between grass clumps but some in the short clumps, deep, perhaps the new green leaves. 2:27, I saw the 6 walking W. on hilltop 200 yds. N. of road (2:19, 1500 yds. S. of road at same pt.) 2:30, 3 (same as yesterday) grazed by road 400 yds. up canyon apparently ♂ of them had chased the 6. The 8 were near mouth of a draw. ²⁵⁰300 yds. up the draw grazed 3 (no young). 2:45, ♂ of 8 walked 75 yds. toward the 3 - but ran quickly back to group when ♂ of 3 ran after it, & all 8 ran for 50 yds. W. of former grazing spot. The new ♂ stopped 50'

Vicugna

November 9, 1951

Huaylarco, 15000', Dpto. Puno

from the 8, then after 2 min. walked 50 yds. to fence rail & def. + ur. (urine in steady surging stream, smaller than ♀♀, & heel-angle about 160° during urination), then walked 50' & grazed. Five (1 pale young; apparently remainder of the 6) grazed 100 yds. from this or. apparently 6 had returned by a round-about route to near former site. 2:55, the 8 were back on grass flat from which they had fled. One ran a few steps at another & seemed to slap spit at it, receiver with head turned away, both standing stiff with ears back (common act in all groups). They worked diligently at buttons of grass about 1" high on otherwise bare ground. Two main grasses; tougher kind forms 6" high clumps, finer kind 1" high clumps, latter apparently preferred. 2 or 3 often feed side by side, almost touching. Feeding diligent. Stratus overcast & occasional raindrops. The youngest of the 6 (150 yds. S. of 8) smaller than any of the young of the 8; still pale spot at base rostrum . 3:10, the 8 at edge creek bed, less than 100 yds. from car. No pregnancy obvious in ♀♀. 3:24, the 6 from the draw approached to 10 yds. from the 8 - no fight or tail raising. One ♀ raised leg to side as if to kick adjacent juv. but did not. or of 6 has 2 scars on left side neck. Some of 8 grazed 3' from water but did not drink. One ♀ ad. gave jump forward & spit forward when another walked close behind it. Two groups 20' apart, each in 5 yd. diameter. 8 graze at streamside clumps of grass & mat. a ♀ ad. kicked up both hind feet together as on a juv. walked close behind - all of both groups gave a start. 3:35, all but 1 of 8 on road side

Vicuña

November 9, 1951 Huaylarco 15000; Dpto. Arequipa
 of creek. The 6 20 yds. away - both groups had withdrawn
 some. One ^{of 8} got closer to 6; ♂ of 6 chased the 8 a
 few yds. back. Then ♂ of 6 quickly walked 50 yds.
 away from the 8 toward some rocks & stood watching
 intently. I saw a few vicuñas running. Then a
 fox, 100' from ♂ of 6, walking slowly & unconcernedly
 by. The ♂ approached to 100' 2 or 3x, then stopped & fox
 went on. The ♂ squealed, resuming note. The 8 some
 20 yds. toward this ♂. The others of 6 followed their
 ♂, stung out. The ♂ of 6 ran at the 8 & chased them
 across creek. They ascended to & crossed road, & when
 a car stopped near mine they ^(the 8) walked up slope to N. The
 6 then grazed where the 8 had grazed for long earlier in
 afternoon (3:50 p.m.). The 5 (not) had returned to where
 I first saw them this p.m. About 300 yds. downstream
 from 11:10 point I saw the 12, now at streamside. Re-
 turned to camp. Wet snow falling 4:30 p.m.

November 10, 1951. Overcast. W. wind. At 2 p.m. drove
 up road from km. 135 1/2. Saw no vicuñas until km.
 139 3/4, near broken bridge. Then 4, no young (prob. ♂ +
 3 ♀), on N. side road 100 yds. Smallest of group had tail
 out ∇ at all times. These were heading for road when
 truck passed 50 yds. away; then slowly reverse course.
 I saw no more near road by km. 140 so turned back. The
 4 on green mat spot. At 3 p.m. they crossed road & ascended
 hill on S. side. Tail of youngest still out. A large black dog
 nr. km. 139, & a truck proceeding very slowly - perhaps hunt.

Vicugna

November 191951

Huaylarco, 15000', Depto. Arequipa

ers. 3:05, an ad. ♂ appeared by stream at km. 139 3/4. It rolled, stood, rolled. Front of neck with 3 scars $\begin{smallmatrix} \circ \circ \\ | \\ \circ \circ \end{smallmatrix}$ as if of 3 cross-wise lines, very evenly spaced. Then 4 came down draw following ♂. One a large young. All crossed road and grazed 100' on S. side, on grass tufted slope. One rolled on grass. One stood facing another 6' away, ears back; other turned head away, ears back; I heard gurgling guttural gravel. One prone, then thrashed on side, then rose. Apparent ♂ thicker neck than others, + has long ^{low} swelling on ventral side center neck. One appears to be yearling. These 5 worked across + up slope. 3:15, a group of 8 (3 young) appeared at streamside (not running) where the 5 earlier. These grazed + worked toward road. The 8 200 yds. from the 5. 3:23, the ♂ leads rest of 5 by 75 yds., going E. across + up slope. The 8 as before, 10 yds. N. of road, grazing where ground cover 5/10, tallest grass (coarse clumps) 6". 3:27, a truck coming up road. The 8 hunched, then walked quickly uphill across road (truck 1/4 mile distant). ♂ lagged 100' behind others, ad. ♀ leads. after truck gone they continue up + across slope following path of the 5. As 3 groups have followed this route in 1/2 hr. I suspect they had been displaced from S. side road by dog or man. 3:31, the 8 atop ridge 250 yds. from where crossed road, ♂ still at rear. I drove down road + found the 6 (1 small young) 150 yds. N. of road where I saw them yesterday, grazing on green flat near stream. Truck stopped near me; a few words; the 6 moved off 50 yds. + grazed. I moved up to 200 yds. opposite them; they walked away up usual draw for 200 yds. One ♀ twice tried to bite neck of another dry

Vicugna

November 10, 1951 Huaylarco, 15000', Depto. Arequipa
 reaching from rear + side. Short pursuit at fast walk. One
 lay prone on grass but up + grazing with others 2 min. later (4 p.m.)
 about $\frac{1}{4}$ mile W. of the C, in same locale where I first saw them
 yesterday, group of 5 (no young). The 8 of yesterday not appar-
 ent. Solid overcast, W. wind, occasional rain. 4:05, the 5 in group
 of 3 + 2, 50 yds. apart. One of 3 prone, then all 3 when rain be-
 came harder, facing downwind. The 6 graze in line abreast.
 4:15, one ad. followed by 8 (2 young) appeared 200 yds.
 N. of the 5 - about where 8 first seen yesterday. 4:20, the 3
 rose one at a time + joined 2, + the 5 looked intently at the 9,
 now 150 yds. away. The 9 moved to 100 yds. from 5. ♂(?) of
 5 ran, head low, to the 9 (cut right behind hill). The 4
 watched for 2 min., then grazed. 4:30, the 6 as before - grazing, spread
 50 yds. I moved 200 yds. along road to see the 9. They were filing
 over top of barren hill, ♂ of 5 200 yds. behind them. 4:35,
 ♂ had not returned to ♀♀ but grazed 50 yds. distant. || On another
 hill I saw a group of 2, both ad. ||. ♀♀ of the 5 moved to
 20 yds. from ♂ (4:40), all 5 together before 5 p.m. At 5 p.m.,
 the 6 + 5 grazing as before. I returned to camp. At 5:15, a
 group of 7, no ^{young}, 200 yds. S. camp.

November 11, 1951. About 2:15 p.m. noted the 7, about 200
 yds. E. of camp, grazing on flat near river bed. Many
 watched vicuñas near km. 138 this morning + saw
 bathing and reactions to a fox. The 7 nearby for until
 about 4:30 p.m., then went uphill when I returned toward
 trail from N. side, taking fright at 300 yds.

November 12, 1951. No rain at night. Warm + partly

Vicugna

November 12, 1951.

Huaylarco, 52 mi. ENE Arequipa

sunny. I drove up road. at 10 a.m. saw 5 (2 young) at km. 137 $\frac{1}{6}$, crossing S. to N. Km 137 $\frac{3}{6}$, 8 (3 young), crossed S. to N. (one ran toward the 5; prob. ♂). also, 200 yds. S. of road, a group of 15 (5 young) at km. 137 $\frac{3}{6}$. Km .138, 150 yds. N. of road, 11 (or +) with 1 (or +) young; and 300 yds. S. road a group of 9. In draw at km. 138 $\frac{2}{6}$, where 5 ad. seen before, only 1 ad. The 6 (1 young) not in usual draw. I returned to watch the 15 at km. 137 $\frac{1}{2}$ (10:15 a.m.). One juv. prone but rose 10:20. at least 3 defec. on side. Half grazing where only faint tinge green on pebbly ground at foot bare slope. 10:25, ad. & ^{juv.} down; only juv. 5 min. later. One scratches chin, head low, with tip hind hoof. another scratches hind upper foreleg with hind toe tip, hind metatarsus horizontal. 10:30, ad. prone - Two others flat on side; 16 total. Doubtless same 16 as seen Nov. 8 here (see p. 234). Two juv. down, rolled. all 16 up 10:35, most staring at road 300 yds. away as man bicycled past. Juv. held hind leg out R & nibbled at medial side knee. 10:39, 4 of juv. prone. Two defec., different pile than before. Hearing whistling alarm call; all but 1 up; staring toward bare rocky hill-fox? 10:45, saw the fox 100 yds. from vicuñas, walking slowly. 7 vicuñas ran toward it, 3 with tails up R, & stopped 100' from fox. Fox paid no attention, walked along river bank. when 100 yds. from vicuñas, they turned away & grazed. Fox came toward me, & at 50 yds. I shot it with .22. Vicuñas, 200 yds. away, ran 150 yds. to 50 yds. up a barren sidehill, then stopped & looked for 2 minutes. Then all started to graze and work slowly across the slope in a C formation. Grazed where $\frac{1}{3}$ ground

Vicugna

November 12, 1951 Huaylarco, 15000; Dpto. Arequipa
 cover, mostly Pyrenophyllum but also tufts coarse grass (apparently not eaten). (Vicūnas had squealed several times when fox near). One (♂?) prone 100 yds. behind the band. 11:15, two juv. defec. on one pile simultaneously. The prone ad. rose. One juv. lay prone. One defec. but did not urinate. 11:23, another defecated only. The ♂(?) standing 100 yds. from group. 11:28, ♂ prone again, same place. Chews cud from side to side. 11:49, ♂ up + walked toward group (none prone now). ♂ walked to 50 yds. from group + group soon joined it. ♂ then led up slope + across to E, 20 yds. ahead of group, so group 300 yds. E. of where at 10:30. 12:10, the group headed S, away from road, + out of my sight on ridge. 11 I drove up road. 5 (no 1), 50 yds. N. of road at km. 138 (± 20 ± 200 yds. further N.). Still 1 in draw at 138 1/2, S. side. 138 3/4, ^{12:30} 8, same toward cars, 100 yds. S. road in flat stream bed where much thick grass. 3 young (as yesterday, 3 - M. K. notes). all wet as if had recently bathed. I watched from car 100 yds. away. Only 1, a juv., dry. 12:55, ♂ of 8 looked to SW intently, then slowly ran 50 yds. that way. A lone adult was 200 yds. distant on a slope. Lone one continued across slope; ♂ grazed. 12:58, an ad. ♀ prone for 1 min. on flat sandy ground. 2 ad. ♀♀ defec. (1 urinated too) on same pile in turn, then all gave a start + ran 20 yds. Then the whole 8 walked together away from ~~creek~~ ^{south}, to foot of bare slope (150 yds. more), + 2 lay prone. Then up 2 min. later + all grazed. 200 yds. E. of the 8 was group 6 (no young) in its usual draw (crossed road from N. of km. 138?). 1:05, ♂ def. + urinated, 100' from rest of 8. Fore + aft distance between front + hind feet about 5" } 1, front

Vicina

November 12, 1931

Huaylarco, 15000', Dpto. Arequipa

legs straight. ♂ walked to 50 yds. E. of group & lay prone; chewed cud, cheeks bulging. One lay down, rose, shake body. One juv. wandered to 20' from prone ♂. ^{an ad. ♀ urin. on side.} 1:13, 3 more to near ♂. One panned ground on forefoot, then prone. The rest ran to near ♂. ♂ up & walked 50 yds. E.; the 1 remained prone & other 6 grazed near it. Hail started. Prone one up. ♂ walked back toward group. Group hunkered for 50 yds. Hail harder. Within 2 minutes all hunkered lay prone facing E., away from wind, heads low (bush tops back). 1:34, hail abated; second ad. ♀ rose & grazed. 1:43, one juv. up. another rested chin on ground. Then ♂ and all rest up (1:44), & all grazed in bunch. 2 p.m., 2 rolled briefly, then ^{rose &} continued to graze. 2:03, ♂, which had been grazing 20 yds. from others, looked to NW, then walked straight in that direction, occasionally pausing, crossed the creek, then on in a lope (out of sight), at least 200 yds. The 7 moved 50 yds.; 2 juv. & 2 ad. ♀♀ defec. & urinated. Then I saw the ♂ chasing 1 of a group of 9 (2 young). One kicked back hind feet at pursuer. The 9 managed to cross to 30' from the 7 ♀♀. One of 9 broke away & chased thru the 7, then ran back to its bunch. The 9 walked up barren slope 100 yds. S. of the 7 ♀♀ (2 young), the ♂ of 8 halfway between the groups. The chase had been accompanied by crow-like throaty cries from the fighting ones (♂♂?). The 5 ad. still in former draw. 2:15 (of 8) 2 juv. rolled on a bare spot on flat ground. ♂ def. on pile. The 9 moved slowly farther away, grazing. The 8 spread 50 yds. One of the 5 dashed off toward the 9 (now out of sight). 2:20, the 5 together again. A juv. of the 8 walked close to male, head high & drawn back. ♂ took a quick step, head

Vicugna

November 12, 1951 Arequipa
 Huaylarco, 15000'; Dpto. Puno
 down, at the juv. + it ran off. As usual the ♂ grazed 20 yds. from the ♀♀ + young. The 5 were 200 yds. up draw from the 8, + the 9 200 yds. beyond the 5, all on nearly flat ground. 2:25, one of the 8 rolled on grass, then up + grazed. Another rolled, rose, shook body. (The 9 probably same as I saw chased down Nov. 10). 3:15, the 8 about the same place. One rolled on side on grass, then other, then quickly jumped to feet. 3:25, ad ♀, then juv. ♀, urinated in turn on one pile. || 3:42, ♂ of the 5 dashed 200 yds. to chase off 12 (or more) that were approaching from W. This ♂ stopped after 400 yds., then slowly walked back toward its ♀♀, passing 100 yds. from the 8 + looking at them but not approaching. 3:53, ♂ of 8 ran a few steps at juv. which put tail up + ^{rolled} head up + back; cry heard. This group 100 yds. NW of 2:20 point. 4:00, one rolled, rose, shook body, the chest more moving back + forth. 4:15, ♂ of 8 looked across road, walked a few feet, then ran to edge road (100 yds.), paused, crossed, paused - apparently saw a group out of my sight. The rest of the 8 grazed + did not follow. ♂ walked back ^{toward} group (4:20), but rolled on the way, + stopped to ^{graze} 75 yds. from them. By 4:25 the rest of group had joined the ♂. Two rolled, then another. 4:27, the group walked quickly back toward the stream (50 yds.). 4:47, 4 (of the 5 - ♂ off somewhere) up the draw walked NW for 1/4 mile, passing 200 yds. SW of the 8. 1/4 mile down canyon a group of 12 near streamside. ♂ of 8 defec. + urin. on pile, then grazed. At 5:05 the 8 still grazed as before, in thick short grass near streamside. The 5 were on rocky dry hillside. At 5:10 the ♂ of group gave chase to a single one nearby +

Vicugna

November 12, 1951 Huaylarco, 15000', Dpto. Arequipa
 chased it $\frac{1}{4}$ mile E., around a circle, then $\frac{1}{4}$ mile W., never
 closer than 10'. Glass-grating cries heard. σ returned to the
 group. This group 200 yds. S. (out of sight of) group of 12
 (5 young) which were ~~at~~ beside stream bed. No change by 5:30.

November 13, 1951. Imata-Huaylarco, 14500-15000'
 On way to El Salitario, & returning, near km. 129, saw
 a few on bare flat desert. Going from Imata to
 Arequipa - Puno road saw: 4 miles, 6 (0 young); 5 miles,
 2 (ad.); 5 $\frac{1}{2}$ miles, 2 (ad.); 8 mi., 8 (1 young); 10 miles,
 28 (4 young) - this last frightened by car, perhaps 2
 groups, if not the biggest group with young
 yet seen. Going from ^{Paty} junction toward camp; 2.1 miles,
 7, 6, & 5, no young, on greenish section of extensive
 barren sandy flat. at km. 13 $\frac{1}{2}$, 10 (2 young).
 at camp, 16 $\sigma\sigma$. Two fought, wrestling with necks
 & tripping legs with necks.


November 14, 1951 Huaylarco, 15000', Dpto. Arequipa
 About 8 a.m. a group of 18, prob. all $\sigma\sigma$, 300 yds.
 E. of camp on grassy flat near stream. about 9 a.m.,
 150 yds. SE of camp, only 16 (same as last eve, probably).
 About 3 p.m., 14 (5 young), 200 yds. S. road
 at km. 13 $\frac{3}{4}$, near head of lake on flat barren
 ground. 10 (as yesterday) 200 yds. N. road at km.
 134. At 4:10 p.m. I stationed myself on road at km.
 136 to watch group of 19 $\sigma\sigma$, no young, 250 yds. S.
 on half barren rolling ground, ground rocky. $\frac{5}{10}$
 cumulus & fairly strong E. wind. There probably some as 16

Vicugna

November 14, 1951. Huaylarco, 15000', Opts. Arequipa
 + 18 we had seen near camp. Several graze on pebbly ground which has no apparent vegetation (20x scope, 300 yds.). One defec on pile; testicles visible. ¹⁷ 10 in 60 yd. diameter; ~~one~~ 2 about 75 yds. from edge group. Less compact than family group. @ 4:33, 8 have struggled up ^{main} canyon; group spread 200 yds. One prone on flat ground; another, 5 yds. away, 4:37; both up 4:39. 11 in close bunch, others scattered in a long line! One crossed low wall into old coral on slope. 4:50, 11 have crossed creek & now 200 yds. from rest of herd; one leading 11 by 50 yds. 4:55, leading one crossed to S. side road, 2 others following at 50 yd. intervals. By 5 p.m., last of those near coral start toward the others (8). 5:10, 7 by stream, 3 100 yds. NE, others out of sight. 5:15, the 10, together, walk slowly E., now 1/4 mile from 4:10 position. All 10 crossed to N. side road by 5:17, not hurrying across roadbed. Then 18 together on mod. slope among bunches grass 50 yds. N. of road. 5:30, 3 crossed to S. side road. 5:40, 2 ran back across road; 3rd. walked across. One a possible young - ^{some of} have young already been driven from family groups by adult ♂? 5:50, the 18 200 yds. N. road on low hill. Strong W. wind, sky clear. Group spread only 100'. 5:53, out of sight over ridge.

November 15, 1951 at 9:45 a.m.; a group of 13 or 14 200 yds. S. of camp. Mary watched the 5A3K at lun. 138% at midday. I went to note at 4:15. 3/10 animals. W. wind, strong. The 8 150 yds. S. of road near streambed, some feeding on at thick grass clumps, others on half bare bare greenish tinged ground. At 4:34, the group walked 20 yds. to -

Vicugna

November 15, 1951 Huaylarco, 15000', Dpto. Arequipa
 ward me, across stream bed. juv. approached ♂, tail high; ♂ gave
 a quick lunge at it & juv. scooted to ♀♀. 4:30, two young passed
 6' from ♂, neither  up + heads back, tail up, & ♂ thrust
 its head out at them as they scampered away, then relaxed. 5:07,
 ♂ walked quickly 100 yds. SNE, defec. on pile. Two all follow-
 owed. 2 juv. defec. (only) on 100' distant pile, & an ad. ♀ def.
 & urinated (urine in spurts of 1-2 seconds). 5:15, ♂ crossed
 to N. side road. ♀♀ followed 100 yds. behind, 2 juv. last.
 (ad. & juv.) Ad. ♀ & one juv. def. & urin.; juv. a ♀. By 5:18 all but 2 had
 crossed road. 5 ad., the usual group, grazed 150 yds. W. of where the
 2 were at 4:15. 5:21, all ran up slope & the 2 crossed road, juv.
 close to ad. ♀, as a truck came down road. Group stopped 50
 yds. N. of road. By 5:45, no change - group spread 50 yds., grazing
 vigorously on 70% covered short grass road slope.

November 16, 1951. at about 8:30 a.m., group of 13, as
 usual, on flat 200 yds. S. road at km. 13 3/4. Still at
 10:10 when I stopped to watch. One nursed ^{about} 1 min. also, then
 group ran 50 yds., perhaps alarmed by car. Then one nursed
 as mother stood on feces pile, hind legs slightly spread.
 This young & another defec. on pile after this nursing. One
 young fairly sure ♂ (saw black penis). One young follow-
 ed a ♀ 10 yds. as if trying to nurse. 10:16, 3 lying on side.
 8/10 rumbling; fair W. wind. ♂, with neck scars, 60 yds. from others.
 & young in this 13. I drove to 150 yds. but they soon moved
 100 yds. away without strong alarm. Groups of 11 + 5 on same
 wide flat about 1/2 mile W. & SW of the 13. Led 50 yds. by ♂,
 the group walked to & across road (10:30), last in file, 200 yds.

Vicugna

November 16, 1951.

Huaylarco, 15000', Dpto. Arequipa

behind σ^7 , a juv. Group went 200 yds. N. of road nr. Km. 133, + grazed on greenish gentle slope. 11:11 a.m., I was at km. 136 1/2. Group of 6 (2 young) 100 yds. S. road, 2 ad. + 1 young prone. One young defec.; apparent σ^7 . Prone 3 chew ends. Bright but no sunshine. About 300 yds. SE of the 6 were at least 12 at stream-side. The 6 on flat rocky ground where clumps coarse grass + tola. 11:15, 3 of the 6 (2 ad. + 1 juv.) 100 yds. from the prone 3. 11:16, prone juv. up & walked slowly toward grazers. Grazing juv. lay prone but up 2 min. later when nearly adults walked on. One prone ad. rolled, then rose. Other rose. The 2 walked E. toward others of group. 11:20, one chasing among the 12. The 6 ran 50 yds. that way, 2 of them, tails up, 100 yds. Then 7 on the rocky flat, ~~the 6 with him of 2 who was off near the 12.~~ Another σ^7 drove the 12 (5 young) 1/4 mile to N., following 10-20 yds. behind. Last of 12 in fleeing bunch was σ^7 with prominent testes + tail up. 4 (1 juv.) near stream where 12 had been; probably σ^7 of this group chasing the 12. 11:27, the 7 move across rocky flat, σ^7 tail up, bringing up the rear & ^{occasionally} stopping to look back toward stream. σ^7 defec. (not urinate). After group walked 200-300 yds. W., σ^7 turned & walked slowly back toward whence they came. 11:37, within 3 minutes 5 of the 6 defecated, including juv. which also urinated, and all were σ^7 or σ^7 . all had testes visible except juv. Thus, some young now with σ^7 or σ^7 bands and family bands cannot be distinguished at this season by presence of young. Thus, actually more young + more σ^7 or σ^7 than my census count indicated! - I counted bands with young as only 1 σ^7 , & large bands as all σ^7 or σ^7 without young. Only the 7th

